

DTIC FILE 0407

1

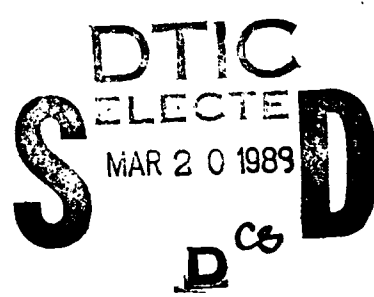


AD-A206 381

Research Product 88-21



Training Systems Concept for the Armored Family of Vehicles With Consideration of the Roles of Embedded Training and Stand-Alone Training Devices



September 1988

Manned Systems Group
Systems Research Laboratory

U.S. Army Research Institute for the Behavioral and Social Sciences

DTIC FILE 0407
Approved for public release;
Distribution Unlimited

Approved for public release; distribution is unlimited

89 3 17 023

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION Unclassified			1b. RESTRICTIVE MARKINGS		
2a. SECURITY CLASSIFICATION AUTHORITY --			3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited.		
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE --			5. MONITORING ORGANIZATION REPORT NUMBER(S) --		
4. PERFORMING ORGANIZATION REPORT NUMBER(S) ARI Research Product 88-21			7a. NAME OF MONITORING ORGANIZATION U.S. Army Research Institute		
6a. NAME OF PERFORMING ORGANIZATION Applied Science Associates, Inc.		6b. OFFICE SYMBOL (If applicable) --		7b. ADDRESS (City, State, and ZIP Code) 5001 Eisenhower Avenue Alexandria, VA 22333-5600	
6c. ADDRESS (City, State, and ZIP Code) P.O. Box 1072 Butler, PA 16003		8a. NAME OF FUNDING/SPONSORING ORGANIZATION Project Manager Training Devices		8b. OFFICE SYMBOL (If applicable) AMCPM-TND-ET	
8c. ADDRESS (City, State, and ZIP Code) NTC-Orlando, FL 32813-7100		9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER OPM-85-19, Work Order No. 319-076			
11. TITLE (Include Security Classification) Training Systems Concepts for the Armored Family of Vehicles with Consideration of the Roles of Embedded Training and Stand-Alone Training Devices		10. SOURCE OF FUNDING NUMBERS			
		PROGRAM ELEMENT NO. 62717A		PROJECT NO. A790	TASK NO. 142
				WORK UNIT ACCESSION NO. 127 C.1	
12. PERSONAL AUTHOR(S) J. Thomas Roth (Applied Science Associates, Inc.), W. Peter Cherry (Vector Research, Inc.), and H.C. Strasel (Hi-tech Systems, Inc.)					
13a. TYPE OF REPORT Final		13b. TIME COVERED FROM 5/87 TO 8/87		14. DATE OF REPORT (Year, Month, Day) 1988, September	
				15. PAGE COUNT 308	
16. SUPPLEMENTARY NOTATION Current Contracting Officer's Representative, Marshall A. Narva.					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP	Embedded Training, Training Devices, Training System Concept, Armored Family of Vehicles, Training Development		
19. ABSTRACT (Continue on reverse if necessary and identify by block number) The Armored Family of Vehicles (AFV) is a new major acquisition program to build the next generation of armored vehicles. The goals of the program are to build the vehicles with the greatest commonality of parts feasible, for cost reasons, and to take advantage of technology advances as needed to meet the mid-1990s threat. This report presents the methods used, the analyses performed, and the resulting conclusions that formulate a hands-on training concept for the AFV in the institution and in the unit. The training media considered were alternative forms of embedded training and stand-alone training devices.					
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION Unclassified		
22a. NAME OF RESPONSIBLE INDIVIDUAL Marshall A. Narva			22b. TELEPHONE (Include Area Code) (202) 274-8876		22c. OFFICE SYMBOL PERI-SM

Training Systems Concept for the Armored Family of Vehicles With Consideration of the Roles of Embedded Training and Stand-Alone Training Devices

J. Thomas Roth

Applied Science Associates, Inc.

W. Peter Cherry

Vector Research, Inc.

H. C. Straszel

Hi-tech Systems, Inc.

Manned Systems Group

John F. Hayes, Chief

Systems Research Laboratory

Robin L. Keese, Director

U.S. Army Research Institute for the Behavioral and Social Sciences

5001 Eisenhower Avenue, Alexandria, Virginia 22333-5600

Office, Deputy Chief of Staff for Personnel

Department of the Army

September 1988

Army Project Number
2Q162717A790

Human Performance Effectiveness and Simulation

U.S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES

**A Field Operating Agency Under the Jurisdiction
of the Deputy Chief of Staff for Personnel**

EDGAR M. JOHNSON
Technical Director

JON W. BLADES
COL, IN
Commanding

U.S. ARMY PROJECT MANAGER FOR TRAINING DEVICES

WILLIAM MARROLETTI
Deputy Project Manager

RICHARD J. LUNDSFORD, JR.
Col, EN
Project Manager

Research accomplished under contract
for the Department of the Army

Applied Sciences Associates, Inc.

Technical review by

Keith Fender, MANPRINT, ODCSPER Office
Don Peckham, PM TRADE, Orlando, Florida

NOTICES

FINAL DISPOSITION: This Research Product may be destroyed when it is no longer needed.
Please do not return it to the U.S. Army Research Institute for the Behavioral and Social Sciences.

NOTE: This Research Product is not to be construed as an official Department of the Army document, unless so designated by other authorized documents.

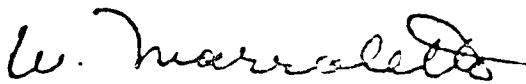
FOREWORD

The need to consider embedded training (ET) as the first training alternative in the development or modification of a system was established as Army policy 1 March 1987. For ET to be effectively implemented, consideration must begin early in the acquisition process.

The Armored Family of Vehicles (AFV) is a major acquisition program to build the next generation of armored vehicles. It is currently in the Concept Development phase. The goals of the program are to build the vehicles with the greatest commonality of parts feasible, for cost reasons, and to take advantage of technology advances as needed to meet effectively the mid-1990s threat.

The AFV Task Force asked Project Manager Training Devices (PM TRADE) and the Army Research Institute for the Behavioral and Social Sciences (ARI) to evaluate the use of ET versus stand-alone training devices (SAD) to support AFV hands-on training requirements. This report presents the resulting training concept for the AFV. It is one of many documents supporting the decision to continue the AFV program. ET was determined to have the primary role in unit training and SAD to have a secondary role. SAD was determined to have the primary role in institutional training.

This research provided a major input to the development of the ET guidelines and procedures document, Implementing Embedded Training (ET): Volume 3 of 10: The Role of ET in the Training System Concept. It is one of 10 volumes that provide the "how to do" for ET.



WILLIAM MARROLETTI
Deputy Project Manager



EDGAR M. JOHNSON
Technical Director

TRAINING SYSTEMS CONCEPT FOR THE ARMORED FAMILY OF VEHICLES WITH CONSIDERATION OF THE ROLES OF EMBEDDED TRAINING AND STAND-ALONE TRAINING DEVICES

EXECUTIVE SUMMARY

Requirement:

The objective of this effort was to develop a training system concept for the Armored Family of Vehicles (AFV) that identified the differential and interlocking roles of Embedded Training (ET) and Stand-Alone Training Devices (SADs). An overall training system concept for AFV was required, as well as training system concepts for selected exemplar mission modules in each of the three AFV weight classes (heavy, medium, and light).

Approach:

This work took place in two phases. The objective of the first phase was to develop a set of functional task areas on which to base training requirements analyses. Also in the first phase, methods for developing the training system concept were developed. The second phase encompassed the development of the training system concepts. The training system concepts for five selected AFV exemplar mission modules (Future Armored Combat System, AFV Howitzer Vehicle, AFV Non-Line-of-Sight Antitank/Air Defense Vehicle, AFV Rocket and Missile System Vehicle, and AFV Armored Escort/Security Vehicle) were developed. The resulting concepts were used to synthesize the overall "umbrella" AFV training system concept.

Findings:

Embedded Training was found to be a prime candidate for AFV overall, as well as for each of the five exemplar mission modules studied. The conceptual role of ET in the training system concepts is principally to support transition or New Equipment Training (NET) at the AFV fielding site, and to sustain, upgrade, and cross train in the unit. ET may also conceptually support training above the crew level, when individual vehicles' ET components are "netted" with other ET components or command group simulations. If properly designed, ET can support fault isolation training for maintainers, as well. The conceptual characteristics of ET for AFV training are based on projections of technology that are expected to mature in the developmental time frame for AFV (between the present and the mid-1990s).

Significant roles for Stand-Alone Training Devices were also identified. Conceptually, positional and team/crew trainers (principally Conduct-of-Fire Trainers) may support acquisition training in the institutional environment, as well as at the AFV fielding site. There may also be need for a unit-level driver trainer to maintain proficiency, if opportunities to drive actual

vehicles are limited. Maintenance trainers conceptually support both institutional and field training for AFV.

Utilization of Findings:

These findings represent an early, preliminary survey of appropriate approaches to support hands-on training for AFV. It is expected that the results of this work will structure future concepts and analyses during development and acquisition of the AFV training subsystem.

LIST OF ABBREVIATIONS AND ACRONYMS

AFV	Armored Family of Vehicles
AMBULANCE	AFV Armored Field Ambulance
ASV	AFV Armored Escort/Security Vehicle
BNAID	AFV Armored Battalion Aid Station Vehicle
BRIDGE	AFV Bridging Vehicle
BTA	Best Technical Approach
C2V	AFV Command and Control Vehicle
CEM	AFV Combat Earthmover Vehicle
CGI	Computer-Generated Imagery
CMD GRP	AFV Command Group Vehicle
CMV	AFV Combat Mobility Vehicle
COFT	Conduct of Fire Trainer
CPX	Command Post Exercise
DEW	AFV Directed Energy Weapon Vehicle
ET	Embedded Training
ETAS	AFV Elevated Target Acquisition System Vehicle
FACS	Future Armored Combat System (a tank)
FIST	AFV Fire Support Team Vehicle
FOG-M	Fiber Optic Guided Missile
HOWITZER	AFV Howitzer Vehicle
IEW	AFV Integrated Electronic Warfare Vehicle
IFP	Identification Friend or Foe
IFV	AFV Infantry Fighting Vehicle
LFAC/AGS	Light Future Armored Combat System/Armored Gun System (light forces direct fire assault vehicle)
LOS-AD	AFV Line-of-Sight Air Defense Vehicle
LOS-AT	AFV Line-of-Sight Anti-Tank Vehicle
MAINT	AFV Forward Maintenance Vehicle
MDV	AFV Mine Dispensing Vehicle
MILES	Multiple Integrated Laser Engagement Simulation System
MLRS	Multiple Launch Rocket System
MOS	Military Occupational Specialty
MRTR	AFV Mortar Vehicle
MSL	AFV Missile Vehicle
NBCRS	AFV Nuclear, Biological, and Chemical Warfare Reconnaissance Vehicle
NLOS-AD/AT	AFV Non-Line-of-Sight Antitank/Air Defense Weapon Vehicle
O&O	Organizational and Operational (Plan)
OPTEMPO	Operational Tempo
P3I	Preplanned Product Improvement
RAMS	Rocket and Missile System
RCKT	AFV Rocket Vehicle
REARM	AFV Armored Rearmament Vehicle
RECON	AFV Battlefield Reconnaissance Vehicle
RECOVERY	AFV Armored Recovery Vehicle
REFUEL	AFV Armored Refueling Vehicle
RESUPPLY	AFV Armored Resupply Vehicle
SAD, SADs	Stand-Alone Training Device(s)
SAPPER	AFV Sapper Vehicle

SIMNET	Simulation NETwork
SMOKE	AFV Battlefield Smoke Vehicle
SSI, SSIs	Soldier-System Interface(s)
TACOM	U.S. Army Tank-Automotive Command
TOC	Tactical Operations Center
WESS	Weapons Effect Signature Simulator

TRAINING SYSTEMS CONCEPT FOR THE ARMORED FAMILY OF VEHICLES WITH CONSIDERATION OF THE ROLES OF EMBEDDED TRAINING AND STAND-ALONE TRAINING DEVICES

CONTENTS

	Page
SECTION 1. INTRODUCTION	1
Overview of the Report	4
SECTION 2. METHODS	5
Phase 1 - Data and Methods Development	5
Phase 2 - Application to Derive the Training System Concept	10
SECTION 3. FINDINGS	13
Training System Concepts Summary Matrix Presentation	13
Training System Concept for the Future Armored Combat System (FACS)	17
Training System Concept for the AFV Howitzer Vehicle	20
Training System Concept for the AFV Non-Line-of-Sight Antitank/ Air Defense Vehicles (NLOS-AT/AD)	23
Training System Concept for the AFV Rocket and Missile System Vehicle	26
Training System Concept for the AFV Armored Escort/Security Vehicle	29
"Umbrella" AFV Training System Concept	31
SECTION 4. DISCUSSION	35
Embedded Training and Training Device Capabilities	35
Software and Training Courseware Commonality	36
"Netting" ET and Other Training Approaches	37
Risk Factors for Consideration in Defining the Ultimate Role of ET in the AFV Training System	37
REFERENCES	43
APPENDIX A. ASSUMPTIONS FOR THIS ANALYSIS	A-1
B. DEFINITION OF TERMS	B-1
C. NOTIONAL AFV GENERAL SOLDIER-SYSTEM INTERFACE SUITE PROFILES	C-1

CONTENTS (Continued)

	Page
APPENDIX D. GUIDANCE FOR FORMULATING TRAINING SYSTEM CONCEPTS FOR DEVELOPMENTAL AND NOTIONAL SYSTEMS INCLUDING THE ROLES OF EMBEDDED TRAINING AND TRAINING DEVICES IN THE TRAINING SYSTEM CONCEPT	D-1
E. PERFORMANCE REQUIREMENTS TAXONOMY	E-1
PREFACE TO APPENDIXES F THROUGH J	F-1
APPENDIX F. TRAINING REQUIREMENTS ANALYSIS DATA FOR FUTURE ARMORED COMBAT SYSTEM (FACS)	F-3
G. TRAINING REQUIREMENTS ANALYSIS DATA FOR AFV HOWITZER VEHICLE	G-1
H. TRAINING REQUIREMENTS ANALYSIS DATA FOR AFV NLOS-AT/AD VEHICLE	H-1
I. TRAINING REQUIREMENTS ANALYSIS DATA FOR AFV ROCKET/MISSILE VEHICLE	I-1
J. TRAINING REQUIREMENTS ANALYSIS DATA FOR AFV ARMORED SECURITY/ESCORT VEHICLE	J-1

LIST OF TABLES

Table 1. AFV acronyms and abbreviations	3
---	---

LIST OF FIGURES

Figure 1. The armored family of vehicles "Family Tree"	2
2. Crew functional performance requirements areas for AFV vehicle variants	6
3. Generic Soldier-System Interfaces (SSIs) for AFV vehicle variants	9
4. Training system concept summary matrix for the Future Armored Combat System (FACS)	19
5. Training system concept summary matrix for the AFV howitzer vehicle	22

CONTENTS (Continued)

	Page
Figure 6. Training system concept summary matrix for the AFV Non-Line-of-Sight Antitank/Air Defense (NLOS-AT/AD) vehicle	25
7. Training system concept summary matrix for the AFV rocket and missile system vehicle	27
8. Training system concept summary matrix for the AFV Armored Escort/Security Vehicle (ASV)	30
9. AFV "umbrella" training system concept summary matrix	32

TRAINING SYSTEMS CONCEPT FOR THE ARMORED FAMILY OF VEHICLES
WITH CONSIDERATION OF THE ROLES OF EMBEDDED TRAINING
AND STAND-ALONE TRAINING DEVICES

SECTION 1

INTRODUCTION

The Armored Family of Vehicles (AFV) is being developed as a system of armored vehicles characterized by chassis, component, and electronics commonality; modularity of mission-specific equipment; commonality of battlefield signature; and multiple system capabilities. AFV is expected to field a force within emerging Army concepts that will be capable of defeating threats expected in the mid-1990's and beyond. In addition, the AFV concept is anticipated to reduce overall systems, force operations, and logistic costs. The AFV concept currently encompasses three generic chassis types and numerous mission modules, as shown in Figure 1. Definition of abbreviations for AFV vehicles is provided in Table 1.

Introducing AFV and sustaining the AFV-equipped force will require unprecedented attention to the training subsystem supporting AFV. The AFV fielding concept involves re-equipping entire brigades with AFV vehicles en masse at one or more designated fielding sites, training at the fielding site, and re-integrating the AFV-equipped brigade with its parent unit. In addition, replacement and sustainment training must be provided to sustain AFV-equipped units after the initial fielding process. In order for the training subsystem for AFV to be in place concurrent with fielding, early and continuous consideration must be given to defining the training system, training requirements, and training support methods.

This report presents the results of analyses to identify training system concepts for AFV. This effort is an initial analysis for the purpose of exploring the potential, conceptual roles of Embedded Training (ET) and various types of Stand-Alone Training Devices (SADs) in a projected AFV training system. In concurrence with recently developed Army policy, ET is being considered as a first alternative for AFV. However, it is expected that not all training can or should be provided by ET capabilities incorporated into the AFV vehicles. The objective of this effort, therefore, is to identify probable hands-on training requirements for AFV, and to develop concepts for the ways in which hands-on training needs may be supported within the AFV training subsystem. This is equivalent to identifying the conceptual roles of ET and various types of SADs in satisfying hands-on training requirements. In turn, this requires specifying which ET or SAD approaches are conceptually most appropriate for each type of training in each training environment (institution, fielding site, and unit).

It must be emphasized that the analyses and training system concepts presented here are preliminary and, therefore, tentative.

THE EMERGING ARMORED FAMILY OF VEHICLES

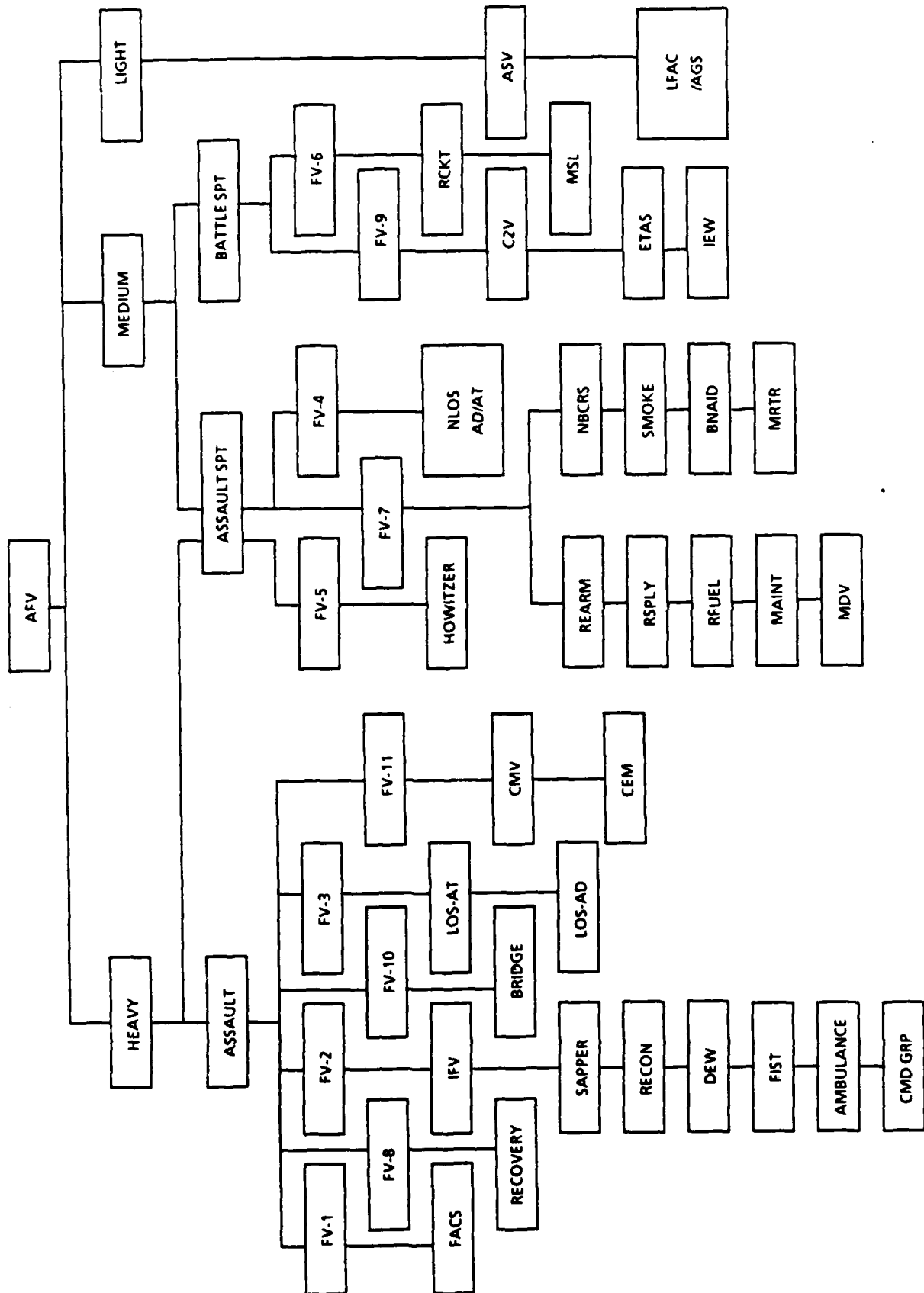


Figure 1. The Armored Family of Vehicles "Family Tree"

Table 1

EXPLANATION OF ABBREVIATIONS FOR AFV VEHICLES

Heavy Chassis Vehicles

FACS	Future Armored Combat System (a tank)
IFV	AFV Infantry Fighting Vehicle
DEW	AFV Directed Energy Weapon Vehicle
HOWITZER	AFV Howitzer Vehicle
FIST	AFV Fire Support Team Vehicle
SAPPER	AFV Sapper Vehicle
CEM	AFV Combat Earthmover Vehicle
CMV	AFV Combat Mobility Vehicle
BRIDGE	AFV Bridging Vehicle
RECOVERY	AFV Armored Recovery vehicle
AMBULANCE	AFV Armored Field Ambulance
LOS-AD	AFV Line-of-Sight Air Defense Vehicle
LOS-AT	AFV Line-of-Sight Anti-Tank Vehicle
RECON	AFV Battlefield Reconnaissance Vehicle
CMD GRP	AFV Command Group Vehicle

Medium Chassis Vehicles

MRTR	AFV Mortar Vehicle
ETAS	AFV Elevated Target Acquisition System Vehicle
REARM	AFV Armored Rearmament Vehicle
REFUEL	AFV Armored Refueling Vehicle
RESUPPLY	AFV Armored Resupply Vehicle
NBCRS	AFV Nuclear, Biological, and Chemical Warfare Reconnaissance Vehicle
MDV	AFV Mine Dispensing Vehicle
MAINT	AFV Forward Maintenance Vehicle
IEW	AFV Integrated Electronic Warfare Vehicle
SMOKE	AFV Battlefield Smoke Vehicle
BNAID	AFV Armored Battalion Aid Station Vehicle
NLOS-AD/AT	AFV Non-Line-of-Sight Antitank/Air Defense Weapon Vehicle
RCKT	AFV Rocket Vehicle
MSL	AFV Missile Vehicle
C2V	AFV Command and Control Vehicle

Light Chassis Vehicles

LFAC/AGS	Light Future Armored Combat System/Armored Gun System (light forces direct fire assault vehicle)
ASV	AFV Armored Escort/Security Vehicle

This analysis was conducted during the concept formulation phase for the AFV automotive systems. Later development of specific AFV mission modules and their integration with generic AFV chassis has the potential to significantly influence training requirements and hands-on training support needs. This will require update and modification of the training system concepts presented here. However, it is anticipated that this and related studies will provide a basis for more detailed definition of AFV training systems later in the system development process.

Overview of the Report

This report consists of four sections and several Appendixes. This section provides the above brief background and statement of objectives. Section 2 describes the methods used for analysis. Section 3 presents the results of the analyses and the training system concepts. Section 4 contains a discussion of several issues which may impact the development and characteristics of the AFV training system.

The Appendixes contain background material that supports the analyses and results presented in the body of the paper. Appendix A presents a variety of assumptions used in the analyses, that collectively represent the authors' perspective on the problems addressed. Appendix B contains specific definition of a number of terms and concepts used in the analyses. Appendix C presents notional soldier-system interface concepts for eight generic crewstation types identified in the analyses. Appendix D presents the decision guidance developed in this effort that was used to develop the training system concepts. Appendix E presents a functional performance requirements taxonomy from which analysis data were derived. Appendixes F through J contain the results of training requirements analyses on five exemplar AFV vehicles that support the training system concepts developed. Appendix F is preceded by a brief summary of the format and meaning of the data elements in the training requirements analysis listings.

SECTION 2

METHODS

The analysis took place in two phases. The first phase was preparatory, and was concerned with assembling data and creating methods for developing the training system concept. The second phase involved applying the methods to the data and developing the training system concept itself. The activities in each of the phases are discussed below.

Note that assumptions used in the analyses and direction of the training system concepts are included in Appendix A to this report. Also, a definition of specific terms used in the training system concepts and the training decision guidance is provided in Appendix B.

Phase 1 - Data and Methods Development

Data Development

One of the initial activities in this effort was to develop data describing functional performance requirements for AFV vehicle crew members, to serve as a basis for defining probable training requirements on which to base the training system concepts. Developing the data for this analysis required identifying a generic set of functional performance requirements and mapping these requirements onto the various AFV systems to serve as a basis for analysis.

The functional performance requirements used are based on a generic operator performance requirements taxonomy developed by Kaplan and Crooks (1980) for the Army Human Engineering Laboratory. The original taxonomy is presented in Appendix E. This taxonomy is at two levels of specificity: performance requirements functional areas; and generic tasks within each functional area. For this analysis, tasks within each functional area were considered, but documentation took place at the functional area level. Two functional performance requirements areas were added for maintenance: one dealing with troubleshooting and fault isolation; the other dealing with service and repair. This resulted in a total of 32 performance requirements areas as candidates to be considered for each vehicle.

The crew functional performance requirements areas applicable to each of the proposed AFV vehicles were identified (maintenance requirements were assumed to apply to all vehicles). This is summarized in Figure 2. In Figure 2, requirements that are part of the primary mission for a vehicle are indicated by "X" symbols and secondary-mission requirements are indicated by crosses. Note that eleven of

the functional performance requirements are present for all vehicles, and an additional two requirements are present for all but the (unarmed) medical vehicles. Given similar Soldier-System Interfaces (SSIs) across the vehicles for crew members that perform tasks in these areas, training requirements should be similar, as well.

Once the performance requirements areas were identified, an analysis database with one record for each of the 32 areas was developed. This database was used as a template for developing the training analysis support databases for the selected exemplar AFV systems.

Soldier-System Interface (SSI) Concepts

In order to identify AFV functional training requirements, a concept of the characteristics of the SSIs of the vehicles was required, so that training decisions could be made. Data to characterize the SSIs was developed from reviews of AFV documentation and from interviews and discussions with AFV Task Force representatives, Tank-Automotive Command (TACOM) personnel, proponent school personnel, and representatives of the three contractor teams developing conceptual approaches for AFV.

SSI characteristics were identified in two stages. In the first stage, the crew positions anticipated to be present in each of the AFV vehicles were identified. The basis for this identification was the most recent available version of the vehicle annexes to the AFV Organizational and Operational (O&O) Plan. The large number of potentially different crew positions associated with the AFV mission modules, and uncertainty about the specific equipment that might be present for some of the positions, suggested reducing the total number by identifying generic crew positions. This was accomplished, resulting in eight generic crew positions:

1. Driver (all vehicles)
2. Assault vehicle commander (all assault vehicles plus the howitzer)
3. Support vehicle commander (all assault support vehicles except the howitzer and all battle support vehicles)
4. Direct fire gunner (all systems with direct fire primary weapons or expected to have a cannon-type self defense weapon or be equipped with anti-tank guided missiles)
5. Indirect fire gunner (all systems with indirect fire primary weapons)
6. Sensor operator (NBC Reconnaissance and Smoke vehicles)

7. Mission equipment operator (logistic, engineer, and support vehicles)
8. Battle staff (Command Group and Command and Control vehicles)

Note that the distinctions between the two types of commander's SSIs and the two types of gunner's SSIs are based on tactical, as well as task-procedural considerations. Employment of the vehicles and weapons, rather than equipment operation, is the discriminating factor here. A number of the vehicles will also carry non-equipment-operating personnel (e.g., infantrymen, scouts, medics, combat engineers). These "positions" are not represented in the generic SSIs. The generic SSIs identified for each of the AFV vehicles, as well as the presence personnel without primary system-operation responsibilities in each vehicle, are illustrated in Figure 3.

The second stage of the SSI characterization process involved identifying the equipment items likely to be present at each of the generic SSIs. This information was required to support the training requirements decisions underlying the training system concept. Available data from Soldiers' Manuals (for predecessor systems) and expert opinion of project team members was used to identify the control and display suites for each generic SSI, at an equipment function or task level. The suites for each of the generic SSIs are shown in Appendix C.

Select Mission Modules for Analysis

The next activity was to select from one to three AFV mission modules in each of the three AFV weight classes on which to perform training requirements analyses. This required an examination of the missions typically performed by the various AFV vehicles, and the SSI equipment suites, to estimate which vehicles would represent typical cases in each weight class. The examination was restricted to primarily weapons-carrying vehicles, since these types of vehicles normally impose the most extreme hands-on training requirements. This examination led to selection of the following mission modules for analysis:

1. Future Armored Combat System (FACS--Heavy Chassis).
2. Howitzer Vehicle (Heavy Chassis).
3. Non-Line-of-Sight Antitank/Air Defense Vehicle (NLOS-AT/AD--Medium Chassis).
4. Rocket and Missile System Vehicle (Medium Chassis).
5. Armored Escort/Security Vehicle (ASV--Light Chassis).

NOTIONAL CREW POSITIONS/SSIs

VEHICLE/ VARIANT	DRV	ASLT CMDR	NON- ASLT CMDR	DIR WPN GUN	IND WPN GUN	SENS OP	MSN EQP OP	STAFF
Heavy Chassis								
FACS	x	x		x				
IFV	x	x		x				7 (Inf.)
DEW	x	x		x				
HOWITZER	x		x		x			
FIST	x		x	x				1 (FO)
SAPPER	x		x	x				5 (Engr.)
CEM	x		x					
CMV	x		x					
BRIDGE	x		x (also bridge op.)					
RECOVERY	x		x					1 (Crane)
AMBULANCE	x							2 (Medics)
LOS-AT	x	x		x				
LOS-AD	x	x		x				
RECON	x	x		x				2 (Scout)
CMD GRP	x		x					3
Medium Chassis								
MORTAR	x	x			x			1 (Loader)
ETAS	x		x (Also mission eq. op.)					
REARM	x		x (Also mission eq. op.)					
RESUPPLY	x		x (Also mission eq. op.)					
REFUEL	x		x (Also mission eq. op.)					
NBCRS	x	x		x		x		
MINE DISP.	x		x (Also mission eq. op.)					
MAINTENANCE	x		x (Also mission eq. op.)					
IEW	x		x					5(ETAS,EW)
SMOKE	x	x			x	x		
BN AID STATION	x							3 (Medical)
NLOS-AT/AD	x		x (Also gunner)					
ROCKET	x		x		x			
MISSILE	x		x		x			
C2V	x	x		x				5
Light Chassis								
LFAC/AGS	x	x		x				
ASV	x	x		x				

Figure 3. Generic Soldier-System Interfaces (SSIs) for AFV Vehicle Variants

The ASV was chosen as the light chassis exemplar, since the only other alternative was the Light Future Armored Combat System/Armored Gun System (LFAC/AGS). LFAC/AGS was considered to be sufficiently similar to FACS in terms of probable performance and training requirements that no unique information would be generated by a training requirements analysis.

After the exemplars were chosen, a training requirements analysis support database was created for each exemplar. The databases contain one record each for each of the functional performance requirements classes applicable to each selected exemplar vehicle, as derived from the matrix presented in Figure 2. These databases were used to record analytic decisions during the training requirements analyses, and to generate the hands-on training requirements information presented in Appendixes F through J of this report.

Develop Decision Guidance and Application Methods

In parallel with the efforts to develop analysis support data described above, training system concept development methods and decision guidance were developed. The objective of this portion of the effort was to create a generic tool for identifying the most appropriate differential and coordinated roles of ET and SADs in a training system.

The tool that was developed consists of decision guidance with respect to 42 identified training situations, or purposes and objectives of training. The decision guidance is presented in Appendix D of this report. The decision guidance indicates the preferred roles of ET and various types of SADs for hands-on training in each of the training situations. This guidance is applied to hands-on training requirements applicable to each training situation, and the results are considered in the aggregate to specify appropriate applications of ET and SADs within the training system.

Phase 2 - Application to Derive the Training System Concept

Once the development of data and decision guidance were complete, analysis to define the training system concept were performed. This analysis took place in two steps, as described below.

Step 1 - Training Requirements Analysis and Hands-On Trained Tasks (HOTT) Assessment

The first step involved several activities. First, the functional performance requirements for each of the five selected AFV exemplars were evaluated, and a number of decisions were made with respect to each performance requirement:

1. Which personnel (crew members, maintainers, commanders and staff) are involved in performing the requirement.
2. At which levels training may need to take place (individual, collective, functional area, combined arms), based on the personnel involved.
3. Estimation of the mission criticality, perishability (likelihood of skill decay once training has taken place), and performance difficulty of the requirement. These factors were rated on a high-moderate-low scale. Also, where criticality and perishability were rated moderate or high for a performance requirement, it was considered to require sustainment training and is a candidate for ET.
4. Based on all three sets of decisions above, whether training (and, specifically, hands-on training) or sustainment are needed to enable the performance requirement to be fulfilled.

The decisions were based on: (1) the characteristics of the generic AFV SSIs used by personnel who carry out each performance requirement, and (2) known operational and tactical employment characteristics of similar requirements in like-type predecessor systems. The generic tasks contained in each functional performance requirements area (Appendix E) were considered in the aggregate, and decisions were recorded for each area. These decisions were made separately for each of the five exemplars, and each decision was documented in the analysis support databases.

Next, each of the identified HOTT requirements was evaluated against each of the 42 training situations defined in the ET SAD roles decision guidance, considering all of the previous decisions. A yes-no judgment was made with respect to whether hands-on training in each situation would be required for each training requirement. This was also conducted separately for each of the five exemplars with the decisions being added to the support databases.

The next activity was to obtain a listing of the HOTT requirements and associated decisions applicable to each of the 42 training situations for each exemplar AFV system. These listings were created from the support databases, and are included as Appendixes F through J of this report. The decision guidance (Appendix D) for each training situation was applied to the collective set of training requirements for that situation, and the decision regarding the most appropriate approach to support hands-on training for the training situation was noted.

Step 2 - Aggregation to Develop Training System Concepts

After the individual hands-on training support decision process for each of the 42 training situations was complete for each of the

five exemplars, the decisions for each exemplar were examined in the aggregate. Decisions implying the use of a particular hands-on training support approach (ET [on-system and netted]; individual/positional, team/crew, and maintenance SADs; and actual equipment training without ET) for particular training situations were grouped.

The groups were then examined for overall implications for support concepts at three training sites: the institution, the AFV fielding site(s), and the unit. Differential implications for appropriate hands-on training support by ET and SADs at each site were identified. These implications were then considered in light of current training practices which suggested logical groupings of training situations. These groupings of training situations by site and purpose, along with ET and SAD role recommendations, make up the training system concepts for the five exemplar AFV systems, presented in Section 3.

Umbrella AFV Training System Concept. The training system concepts for the five exemplars were examined collectively to determine if a simple combination of the concepts would be adequate to define hands-on training support roles for AFV at large. This was deemed appropriate, with one exception. It was noted that none of the five exemplars indicated the use of individual/positional SADs for either sensor operator or mission equipment operator positions. However, the SSIs were not present on any of the five exemplar vehicles. Given the number of AFV vehicles which are expected to have SSIs for such positions, it was decided that a potential for the development and use of such devices exists. These were subsequently added (at the concept level) to define the overall AFV training system concept.

SECTION 3

FINDINGS

This section of the report presents the training system concepts for the five exemplar AFV vehicles chosen for study, as well as the overall AFV training system concept. It must be made explicit that these training system concepts deal only with candidate means of supporting hands-on skill training. Knowledge training and general education are presumed to be integrated with hands-on skill training in resident courses; and provided as well by training extension courses, Army training literature, doctrinal manuals and handbooks, and other conventional training methods and media.

Training System Concepts Summary Matrix Presentation

The six training system concepts presented in this section are summarized in the form of matrices showing the application of the various candidate means of supporting hands-on training to various training situations and sites. Before presenting the training system concepts themselves, the following explanation of the makeup of the matrices is included.

Explanation of Matrix Vertical Axis

The vertical axis of each matrix indicates training situations, grouped by training sites (institutional, fielding site, and unit). The training situations included in the vertical axis of each matrix are composites of those used for the training requirements analyses. The source training situations (defined in Appendix D) that were aggregated to make up each training situation in the matrices are indicated by numbers in parentheses next to the named training situation. For example, under the "Pipeline/Replacement Training" heading in each matrix, the entry "Individual Operation Skills Acquisition" is followed by numbers indicating that this training is comprised of six training situations (1, 2, 3, 13, 14, 15) used in the training requirements analysis. These indicate, in turn, that the following (analytic) training situations are served by institutional pipeline training:

1. Individual common MOS skills acquisition (analytic situation #1)

2. Individual system operation skills acquisition (analytic situation #2)
3. Individual system utilization skills acquisition (analytic situation #3)
4. Individual crewmember maintenance acquisition (system anatomy and geometry and theory of operation; analytic situation #13)
5. Individual crewmember maintenance fault isolation and troubleshooting skills acquisition (analytic situation #14)
6. Individual crewmember maintenance service and repair skills acquisition (analytic situation #15).

Several training situations are dealt with under each of the three training sites that appear in the vertical axis of the matrices. Under institutional training, the following situations are included:

1. Pipeline and replacement training, comprehending both individual and collective system operation and utilization skills acquisition;
2. Maintainer skills acquisition; and
3. Leadership and management training for crewmembers, maintainers, and commanders and battle staff.

Under fielding site training, the following situations are included:

1. Individual crewmember system operation and utilization transition training; and
2. Maintainer transition training.

The following training situations are included under unit training:

1. Sustainment training for crewmembers and maintainers;
2. Upgrade and skill progression training for crewmembers and maintainers;
3. Positional cross-training within crews;
4. Functional area sustainment training (collective above crew level but excluding combined arms); and
5. Force-level combined arms sustainment training.

Explanation of Matrix Horizontal Axis

The horizontal axis of each matrix depicts hands-on training support approaches. The hands-on training support approaches that appear in the matrices are the following:

1. "System" ET - Embedded Training employed for purposes of training individuals or crews, provided by the Embedded Training component of one vehicle, not "netted" with other ET components or external data sources.
2. "Netted" ET-Simulation Network (SIMNET) - the use of the Embedded Training components of multiple systems in a coordinated, "netted" fashion to provide training at higher than the crew level. The use of the term SIMNET in this title comprehends the potential for interfacing training at multiple sites or with multiple purposes for training above the crew level. For example, members of a battalion Tactical Operations Center (TOC) conducting a Command Post Exercise (CPX) might exchange orders and information over a network with vehicle crews conducting force-on-force simulated training via "netted" ET.
3. Positional trainers - SADs used to train a single crew position at a time. Eight possible varieties of positional trainers, corresponding to the eight generic crew positions or Soldier-System Interface (SSI) suites defined in the analysis, are included. They are:

- D - driver trainer
- CC - combat vehicle commander positional trainer
(never identified in the analyses, but included for completeness and consistency with the generic SSIs)
- SC - support vehicle commander positional trainer
(never identified in the analyses)
- DG - direct fire weapons gunner positional trainer
- IG - indirect fire weapons gunner positional trainer
- SO - sensor operator positional trainer (such trainers are likely to be unique to mission modules, but no basis exists for identifying specific variant characteristics at this stage of AFV development)
- MO - mission equipment operator positional trainer
(such trainers are likely to be unique to mission

modules, but no basis exists for identifying specific variant characteristics at this stage of AFV development)

BT - battle staff positional trainer (never identified in the analyses).

4. Actual equipment (no ET) - actual vehicles used for training without use of ET stimulation and simulation capabilities. Such uses include drills, exercises of all sorts, range firing, and other conventional hands-on training uses of vehicles and mission modules. For exercise force-on-force training, this alternative explicitly comprehends the use of engagement simulation devices and support equipment, including Multiple Integrated Laser Engagement Simulation System (MILES) equipment, Weapons Effects Signature Simulators (WESS), etc. This alternative also comprehends the potential use of subcaliber devices for limited area range firing, as well as inert rounds, explosives, and pyrotechnics for handling practice.
5. Team/crew trainers - SADs that train teams/crews or subsets of teams/crews in collective tasks. This alternative also explicitly includes command group training simulations.
6. Maintenance trainers - SADs that train maintenance skills for maintainer Military Occupational Specialties (MOSs).

Explanation of Matrix Entries

A number of different entries are used in matrix cells, each having a different meaning. These meanings are:

1. No entry in a matrix cell indicates that the training support approach indicated is not a candidate for supporting the training situation indicated.
2. An "X" symbol indicates that the hands-on training support approach indicated is a preferred candidate for supporting the training situation indicated. There may be more than one preferred candidate, indicating a mixed support approach is recommended. The "X" symbol is sometimes accompanied by parenthesized words. The symbol (STAFF) indicates the use of command group simulations for commander and battle staff training. The symbol (JOB) indicates that on-job experience serves a training role for maintainers.
3. The symbol "LIMITED" indicates that limited actual equipment training (relative to the baseline of totally

conventional, non-device-based actual equipment training) is a candidate for inclusion in the support mix for the indicated training situation.

4. The symbol "MINOR" indicates a potential minor role for the training support approach indicated in supporting the indicated training situation.
5. The symbol "SIMNET" indicates that networked or interactive simulations (potentially including vehicle-level or "netted" ET) are a candidate for supporting the indicated training situation.
6. The symbol "NET-ET" indicates that the use of "netted" ET components between two or more vehicles or mission modules is a candidate for supporting the training situation indicated.
7. The symbol "T/S ONLY" indicates that ET is a candidate for maintainer training, but only to support troubleshooting and fault isolation skills training. In this application, ET may or may not be interfaced with external test equipment or built-in test capabilities.
8. The symbols "I-COFT," "U-COFT," and "POSS. COFT" indicate, respectively, that Institutional (I-) and Unit (U-) Conduct-of-Fire Trainers (COFT) are candidates for supporting battlefield surveillance tasks and precision gunnery training in the indicated training situations, and that there is a potential, but uncertain application for a COFT to support a given training situation. The "POSS. COFT" symbol is used only in the matrix for the Armored Escort/Security Vehicle. What is referred to here is the functional training capability represented by COFT devices, whether implemented as SADs or embedded. This will remain a technology-based tradeoff area in later AFV development.

Discussion of the five training system concepts for the exemplar systems follows. This section is concluded by a discussion of the "umbrella" training system concept for AFV.

Training System Concept for the Future Armored Combat System (FACS)

FACS is projected as a successor to the M1 series tanks now in service. It will be developed on the AFV heavy chassis, and will be armed with a direct-fire cannon weapon system and coaxial and self-defense weapons. The FACS sensor suite will include conventional panoramic and gunner's sights (day and night capability), a night driving capability, a non-cooperative passive Identification Friend or Foe (IFF) capability, and possibly advanced sensors such as laser radar. FACS SSIs will retain many or all of the functional elements

present in predecessor tanks, but many controls and displays will be integrated through vetronics. The projected FACS crew complement is three: driver, gunner, and tank commander. No loader crewmember will be needed since a highly reliable autoloader will be fitted.

The training system concept summary matrix for FACS training is presented in Figure 4. As evident from the matrix entries, Embedded Training is considered a preferred conceptual candidate for many fielding and unit training situations, but is not a preferred alternative for institutional training. Training requirements analysis data for FACS is presented in Appendix F.

Under the AFV fielding concept, a number of additional vehicles will be fielded simultaneously with FACS, in FACS-equipped brigades. These are projected to include the following vehicles: Recovery, Bridge, Reconnaissance, Resupply, Rearm, Refuel, Ambulance, Battalion Aid Station, LOS-AT, LOS-AD, Maintenance, Command and Control; and possibly the Sapper, IFV, CEM, QMV, and Smoke vehicles. It is critical to note that under this fielding concept, each of the total training systems for all of the involved vehicles (including fielding site training, institutional replacement training, and unit training) must be in place and ready for training at the first introduction of AFV vehicles to a brigade. Furthermore, coordinated training must take place across the entire unit (and all vehicles), to ensure that not only system operation and utilization skills, but "how to fight as a unit" skills, as well, are developed in AFV-equipped units.

Institutional Training

Pipeline and Replacement Training. Institutional system operator and crew replacement training is supported by a mix of positional (driver and gunner) and crew trainers (I-COFT), and limited actual equipment training. If an I-COFT is adopted, it may make provision of a gunner positional trainer unnecessary. Given the likely commonality of driver SSIs across vehicles, a generic AFV driver trainer (or a "heavy chassis" driver trainer) may be utilized. Limited use of actual equipment (non-ET) training is indicated, primarily for drills and tactical training exercises for "how to fight" purposes.

Maintenance trainers are indicated for maintainer-MOS replacement training for unit, Direct Support and General Support replacement personnel. Limited use of actual equipment is indicated, primarily for familiarization with system anatomy and geometry.

Leadership and Management Training. On-equipment tasks in institutional leadership and management training (NCO and officer courses) are principally supported by actual equipment training, with possible use of maintenance trainers for maintainers and possible minor use of ET for system crewmembers. Training for commanders and battle staff in the institution is supported by a mix of exercise-oriented actual equipment training and simulations (e.g., ARTBASS), possibly integrated via SIMNET.

Future Armored Combat System (FACS) Training System Concept

Future Armored Combat System (FACS) Training System Concept			Hand-On Training Support Approaches												
Training Situations and Sites	System ET	Netted SIMNET	Positional Trainers*†									Actual Equipment (No ET)**	Team/ Crew Trainers***	Maintenance Trainers	
			D	CC	SC	DG	IG	SO	MO	BT					
INSTITUTIONAL TRAINING															
Pipeline/Replacement Training															
Individual Operation Skills															
Aquisition (1,2,3,13,14,15)			X				X					Limited			
Collective Operation Skills															
Aquisition (28,29,30)												Limited	I-COFT		
Maintainer Skills Aquisition (19,20,21,44)												Fam. Only		X	
Leadership/Management Training															
Crewmembers (12)	Minor														
Maintainers (27)												X		X	
Commanders, Battle Staff (39,41)		SIMNET										X			
FIELDING SITE TRAINING															
New Equipment/Transition Training															
Individual Operation Training															
(10,11,13,14,15)	X		X				X					Limited			
Collective Operation Training (37,38)	X											Limited	U-COFT		
Maintainer Training (26)	T/S Only											X		X	
UNIT TRAINING															
Sustainment Training															
Individual Operation Training (4,5,16,17)	X		X									Limited			
Collective Operation Training (31,32)	X	NET-ET										X	U-COFT		
Maintainer Training (23,24)	T/S Only											X (Job)			
Upgrade/Skill Progression Training															
Individual Operation Training (6,7,18)	X														
Collective Operation Training (33,34)	X												U-COFT		
Maintainer Training (25)	T/S Only											X (Job)			
Positional Cross-Training															
Individual Operation Training (8,9)	X											Limited			
Collective Operation Training (35,36)	X											Limited	U-COFT		
Functional Area Training															
Systems Utilization Sustainment (40)		X										X			
Force-Level Training															
Combined Arms Systems Utilization Sustainment (42)		X										X			

* Includes all types of Stand-Alone Training Devices (SADs) used for training equipment operation and utilization at a single crew position, but excluding team or crew trainers (e.g., driver trainers, precision gunnery trainers, equipment operation trainers)

** Includes all use of actual equipment, not utilizing ET capabilities, for training – including drills, exercises, range firing, etc. – and comprehends the possible use of engagement simulation devices and equipment such as MILES, WESS, Hoffman device, etc.

*** Includes all SADs which are used to train crews or crew subsets in specific functional or task areas (e.g., COFTs, crew trainers); also includes command group training simulations and SIMNET

† Abbreviations for position titles: D - Driver; CC - Assault Vehicle Commander; SC - Support Vehicle Commander; DG - Direct Fire Weapons Gunner; IG - Indirect Fire Weapons Gunner; SO - Sensor Operator; MO - Mission Equipment Operator; BT - Commanders and Battle Staff

Figure 4. Training System Concept Summary Matrix for the Future Armored Combat System (FACS)

Fielding Site Training

Transition training at the AFV fielding site is supported by essentially the same SAD mix as indicated for institutional replacement training, plus extensive use of ET for individual and crew training. COFT-type engagement simulation capability is indicated for crew training. This may be achieved through either SADs or by visual simulation and scenario presentation capabilities incorporated in ET. Also, there is the potential to use strap-on, alternative equipment to augment ET for engagement simulation training, if it is not feasible to fully embed these capabilities. If ET visual simulation capabilities are adequate to support performance of battlefield surveillance and target acquisition tasks, a U-COFT is likely to be redundant with the ET capability. If ET capabilities are initially insufficient to support visual simulation at this level, but can later be upgraded later via Preplanned Product Improvements (P3Is), then U-COFTs might be utilized initially, and phased to institutional or Reserve and National Guard training at a later time.

ET is indicated for maintainer troubleshooting and fault isolation training. Also, maintenance trainers and on-equipment training will be utilized for maintenance training for all levels of maintenance.

Unit Training

Individual and crew training (sustainment, upgrade, and cross-training) is principally supported by a mix of ET and actual equipment training, supplemented by commander and gunner training utilizing U-COFTs. The same tradeoff of ET visual simulation capabilities against U-COFT requirements as discussed above applies to unit training. "Netted" ET is indicated as a potential for some crew training, as well. A positional SAD for vehicle driver sustainment is indicated, due to the likelihood that day and night practice driving of vehicles may be limited by Operational Tempo (OPTEMPO) restrictions. This trainer is expected to be an AFV common (or heavy chassis common) device.

Maintenance training in the unit setting (including Direct Support and General Support) is supported by ET for troubleshooting and fault isolation, and by practice in maintaining the actual vehicle and mission module systems.

Functional area and force-level training are supported in the unit by conventional exercise-based training. Also indicated is the potential of using "netted" ET, possibly interfaced or networked with command group simulations, to support these types of training.

Training System Concept for the AFV Howitzer Vehicle

The AFV howitzer vehicle is a projected successor to the M109 series of howitzers. This vehicle is projected to be based on the AFV

heavy chassis. The principal armament for this system is a rapid-firing artillery cannon equipped with a highly reliable autoloader. A self-defense weapon is also provided. The howitzer crew complement is projected to be three: chief of section (commander), cannoneer, and driver. The autoloader eliminates the need for an assistant cannoneer or loader. Highly accurate vehicle location and navigation systems will be incorporated to enable independent vehicle operations and survivable tactics ("shoot and scoot"). Howitzer SSIs will retain most functional elements present in predecessor systems, but control and display functions will be integrated through vetronics and multifunction displays.

The training system concept summary matrix for the AFV howitzer is presented in Figure 5. As indicated by this matrix, Embedded Training is a preferred alternative for fielding site and unit training, but not for institutional training. Training requirements analysis data for the howitzer is presented in Appendix G.

Under the AFV fielding concept, a number of additional vehicles will be fielded simultaneously with the AFV howitzer, in howitzer-equipped brigades. These are projected to include the following vehicles: FIST, Recovery, Resupply, Rearm, Ambulance, Battalion Aid Station, NLOS-AD, Maintenance, Command and Control; and possibly the CEM, CMV, Refuel, and ASV vehicles. If the current AFV fielding concept is to be followed, the total training systems for each vehicle (including fielding site training, institutional replacement training, and unit training) must be in place and ready for training at the first introduction of AFV vehicles to a brigade. Furthermore, coordinated training must take place across the entire unit (and all vehicles), to ensure that not only system operation and utilization skills, but "how to fight as a unit" skills, as well, are developed in AFV-equipped units.

Institutional Training

Pipeline and Replacement Training. Institutional system operator and crew replacement training is supported by a mix of positional and crew SADs, and by limited training with actual equipment. Both a driver positional trainer (the AFV or heavy chassis generic driver trainer) and a cannoneer (indirect fire weapons gunner) trainer are indicated. Crew-level collective training is supported by a crew training SAD and by limited exercise use of vehicles for "how to fight" training.

Maintenance trainers are indicated for maintenance-MOS replacement training for all levels of maintenance. Limited use of actual equipment is also indicated, primarily for familiarization with system anatomy and geometry.

Leadership and Management Training. On-equipment tasks in leadership and management training (NCO and officer courses) are principally supported by actual equipment training, the crew SAD, and maintenance

AFV Howitzer Training System Concept		Hand-On Training Support Approaches											
Training Situations and Sites	System ET	Netted SIMNET	Positional Trainers*†								Actual Equipment (No ET)**	Team/ Crew Trainers***	Maintenance Trainers
			D	CC	SC	DG	IG	SO	MO	BT			
INSTITUTIONAL TRAINING													
Pipeline/Replacement Training													
Individual Operation Skills													
Aquisition (1,2,3,13,14,15)			X					X				Limited	
Collective Operation Skills												Limited	X
Aquisition (28,29,30)												Fam. Only	
Maintainer Skills Aquisition (19,20,21,22)													X
Leadership/Management Training													
Crewmembers (12)	Minor											Limited	X
Maintainers (27)												Limited	
Commanders, Battle Staff (39,41)		SIMNET										Limited	
FIELDING SITE TRAINING													
New Equipment/Transition Training													
Individual Operation Training													
(10,11,13,14,15)	X		X					X				Limited	
Collective Operation Training (37,38)	X											Limited	
Maintainer Training (26)	T/S Only											X	X
UNIT TRAINING													
Sustainment Training													
Individual Operation Training (4,5,16,17)	X		X									Limited	
Collective Operation Training (31,32)	X	NET-ET										X	
Maintainer Training (23,24)	T/S Only											X (Job)	
Upgrade/Skill Progression Training													
Individual Operation Training (6,7,18)	X											Limited	
Collective Operation Training (33,34)	X											Limited	
Maintainer Training (25)	T/S Only											X (Job)	
Positional Cross-Training													
Individual Operation Training (8,9)	X											Limited	
Collective Operation Training (35,36)	X											Limited	
Functional Area Training													
Systems Utilization Sustainment (40)		X										X	
Force-Level Training													
Combined Arms Systems Utilization Sustainment (42)		X										X	

* Includes all types of Stand-Alone Training Devices (SADs) used for training equipment operation and utilization at a single crew position, but excluding team or crew trainers (e.g., driver trainers, precision gunnery trainers, equipment operation trainers)

** Includes all use of actual equipment, not utilizing ET capabilities, for training – including drills, exercises, range firing, etc. – and comprehends the possible use of engagement simulation devices and equipment such as MILES, WEISS, Hoffman device, etc.

*** Includes all SADs which are used to train crews or crew subsets in specific functional or task areas (e.g., COFTs, crew trainers); also includes command group training simulations and SIMNET

† Abbreviations for position titles: D - Driver; CC - Assault Vehicle Commander; SC - Support Vehicle Commander; DG - Direct Fire Weapons Gunner; IG - Indirect Fire Weapons Gunner; SO - Sensor Operator; MO - Mission Equipment Operator; BT - Commanders and Battle Staff

Figure 5. Training System Concept Summary Matrix for the AFV Howitzer Vehicle

trainers. Minor use of vehicle ET capabilities in this training is also a possibility. Training for commanders and battle staff in the institution is supported by a mix of actual equipment training and simulations, possibly integrated via SIMNET.

Fielding Site Training

Transition training at the AFV fielding site is supported by the same positional and maintenance SADs used in institutional training, plus extensive use of ET for individual and crew training, and for maintenance troubleshooting and fault isolation. Some maintenance training is also conducted on actual equipment. All levels of maintenance from unit to General Support may be trained during fielding site training.

Unit Training

Individual and crew training (sustainment, upgrade, and cross-training) is supported by a mix of ET and actual equipment (exercise) training. "Netted" ET is indicated as a potential for some crew training, as well. A positional driver trainer is also indicated for sustainment in the unit, under the assumption that day and night driving training of actual vehicles may be restricted.

Maintenance training for all levels of maintenance is supported by ET for troubleshooting and fault isolation, and by practice in maintaining the actual vehicle and mission module systems.

Functional area and force-level training are supported in the unit by conventional exercise-based training. Also indicated is the potential of using "netted" ET, possibly interfaced or networked with command group simulations, to support these types of training.

Training System Concept for the AFV Non-Line-of-Sight Antitank/Air Defense Vehicles (NLOS-AT/AD)

The AFV NLOS-AT/AD vehicles are expected to employ the Fiber Optic Guided Missile (FOG-M) weapon system, or a successor, in antitank and air defense roles, respectively. The NLOS-AT/AD mission modules will be mounted on a medium AFV chassis. Expected crew complement for these vehicles is two: vehicle commander/gunner and driver. The vehicles will be equipped with advanced navigation and location systems to enable precise vehicle location for mission planning and independent movement on the battlefield.

The training system concept summary matrix for NLOS-AT/AD training is presented in Figure 6. As noted, Embedded Training plays a major role in this training system concept for fielding site and unit training. Training requirements analysis data for NLOS-AT/AD is presented in Appendix H.

Under the AFV fielding concept, a number of additional vehicles will be fielded simultaneously with NLOS-AT/AD, by unit. These are projected to include the following vehicles: Recovery, Resupply, Rearm, Ambulance, Battalion Aid Station, Maintenance, Command and Control; and possibly the Refuel, ETAS, and ASV vehicles. With the present AFV fielding concept, each of the total training systems for all of the involved vehicles (including fielding site training, institutional replacement training, and unit training) must be in place and ready for training at the first introduction of AFV vehicles to a brigade. Furthermore, coordinated training must take place across the entire unit (and all vehicles), to ensure that not only system operation and utilization skills, but "how to fight as a unit" skills, as well, are developed in AFV-equipped units.

Institutional Training

Pipeline and Replacement Training. Institutional system operator and crew replacement training is supported by two positional SADs and limited actual equipment training. A driver trainer (generic AFV or medium chassis driver trainer) is used for driver training. An indirect weapons gunner trainer (FOG-M console trainer) is used for training gunner functions. Actual equipment use for institutional crew training is minimal.

Maintenance trainers are indicated for maintenance-MOS replacement training for all levels of maintenance. Limited use of actual equipment is also indicated, primarily for familiarization with system anatomy and geometry.

Leadership and Management Training. Leadership and Management training (NCO and officer courses) involving hands-on tasks will be supported primarily by limited actual equipment training. Some use may be made of networked command group simulations, if commanders and battle staff are to be trained. If hands-on maintenance training is required, it will be supported by maintenance trainers.

Fielding Site Training

Fielding site training for NLOS-AT/AD crewmembers is supported primarily by ET and by the same type of driver trainer used for institutional training. Limited exercise-based actual equipment training may be used for tactical training purposes ("how to fight").

Maintainer training for all levels of maintenance will be supported by the same maintenance trainers provided for institutional

AFV NLOS-AT/AD
Training System Concept

AFV NLOS-AT/AD Training System Concept		Hand-On Training Support Approaches												
Training Situations and Sites	System ET	Netted SIMNET	Positional Trainers*†								Actual Equipment (No ET)**	Team/ Crew Trainers***	Maintenance Trainers	
			D	CC	SC	DG	IG	SO	MO	BT				
INSTITUTIONAL TRAINING														
Pipeline/Replacement Training														
Individual Operation Skills														
Aquisition (1,2,3,13,14,15)			X			X						Limited		
Collective Operation Skills												Limited		
Aquisition (28,29,30)												Limited		
Maintainer Skills Aquisition (19,20,21,22)												Fam. Only		X
Leadership/Management Training														
Crewmembers (12)												Limited		
Maintainers (27)												Limited		X
Commanders, Battle Staff (39,41)		SIMNET										Limited		
FIELDING SITE TRAINING														
New Equipment/Transition Training														
Individual Operation Training														
(10,11,13,14,15)	X		X									Limited		
Collective Operation Training (37,38)	X											Limited		
Maintainer Training (26)	T/S Only											X		X
UNIT TRAINING														
Sustainment Training														
Individual Operation Training (4,5,16,17)	X											Limited		
Collective Operation Training (31,32)	X	NET-ET										Limited		
Maintainer Training (23,24)	T/S Only											X (Job)		
Upgrade/Skill Progression Training														
Individual Operation Training (6,7,18)	X											Limited		
Collective Operation Training (33,34)	X											Limited		
Maintainer Training (25)	T/S Only											X (Job)		
Positional Cross-Training														
Individual Operation Training (8,9)	X											Limited		
Collective Operation Training (35,36)	X											Limited		
Functional Area Training														
Systems Utilization Sustainment (40)		X										X		
Force-Level Training														
Combined Arms Systems Utilization														
Sustainment (42)		X										X		

* Includes all types of Stand-Alone Training Devices (SADs) used for training equipment operation and utilization at a single crew position, but excluding team or crew trainers (e.g., driver trainers, precision gunnery trainers, equipment operation trainers)

** Includes all use of actual equipment, not utilizing ET capabilities, for training – including drills, exercises, range firing, etc. – and comprehends the possible use of engagement simulation devices and equipment such as MILES, WECS, Hoffman device, etc.

*** Includes all SADs which are used to train crews or crew subsets in specific functional or task areas (e.g., COFTs, crew trainers); also includes command group training simulations and SIMNET

† Abbreviations for position titles: D - Driver; CC - Assault Vehicle Commander; SC - Support Vehicle Commander; DG - Direct Fire Weapons Gunner; IG - Indirect Fire Weapons Gunner; SO - Sensor Operator; MO - Mission Equipment Operator; BT - Commanders and Battle Staff

Figure 6. Training System Concept Summary Matrix for the AFV
Non-Line-of-Sight Antitank/Air Defense (NLOS-AT/AD)
Vehicle

training. Troubleshooting and fault isolation training will be supported by vehicle ET, with or without connections to external test equipment. Maintainer training is also supported by actual equipment practice.

Unit Training

Individual and crew training (sustainment, upgrade, and cross-training) is supported by ET and limited exercise-based actual equipment training. "Netted" ET may be used to support collective training above the crew level.

Maintainer training from unit to the General Support level is supported by ET for fault isolation and troubleshooting training, and by practice in maintaining the actual vehicle and mission module systems.

Functional area and force-level training are supported in the unit by conventional exercise-based training. There is also the potential of using "netted" ET, possibly interfaced or networked with command group simulations, to support these types of training.

Training System Concept for the AFV Rocket and Missile System Vehicle

The AFV Rocket and Missile System Vehicle (RAMS) is a proposed successor to the fielded Multiple Launch Rocket System (MLRS). This system will be developed on the AFV medium chassis. Variants will be armed with unguided rockets or guided missiles. The crew complement is projected to be three: driver, commander, and gunner. SSIs are projected to retain most or all of the functional elements of MLRS SSIs, but with many controls and displays integrated through vetronics.

The training system concept summary matrix for RAMS is presented in Figure 7. As noted, Embedded Training is considered a preferred candidate for fielding site and unit training, but not for institutional training. Training requirements analysis data for RAMS is presented in Appendix I.

Under the AFV fielding concept, a number of vehicles will be fielded simultaneously with RAMS, to equip an entire brigade. These are projected to include the following vehicles: Recovery, Resupply, Rearm, Ambulance, Battalion Aid Station, Maintenance, Command and Control; and possibly the Refuel, Smoke, and ASV vehicles. Under this fielding concept, each of the total training systems for all of the involved vehicles (including fielding site training, institutional replacement training, and unit training) must be in place and ready for training at the first introduction of AFV vehicles to a brigade. Furthermore, coordinated training must take place across the entire unit (and all vehicles), to ensure that not only system operation and utilization skills, but "how to fight as a unit" skills, as well, are developed in AFV-equipped units.

AFV Rocket/Missile System Training System Concept

AFV Rocket/Missile System Training System Concept	Hand-On Training Support Approaches													
Training Situations and Sites	System ET	Netted SIMNET	Positional Trainers*†									Actual Equipment (No ET)**	Team/ Crew Trainers***	Maintenance Trainers
			D	CC	SC	DG	IG	SO	MO	BT				
INSTITUTIONAL TRAINING														
Pipeline/Replacement Training														
Individual Operation Skills Aquisition (1,2,3,13,14,15)			X					X				Limited		
Collective Operation Skills Aquisition (28,29,30)												Limited		
Maintainer Skills Aquisition (19,20,21,22)												Fam. Only		X
Leadership/Management Training														
Crewmembers (12)	Minor											Limited		
Maintainers (27)												Limited		X
Commanders, Battle Staff (39,41)		SIMNET										Limited		
FIELDING SITE TRAINING														
New Equipment/Transition Training														
Individual Operation Training (10,11,13,14,15)	X		X									Limited		
Collective Operation Training (37,38)	X											Limited		
Maintainer Training (26)	T/S Only											X		X
UNIT TRAINING														
Sustainment Training														
Individual Operation Training (4,5,16,17)	X											Limited		
Collective Operation Training (31,32)	X	NET-ET										Limited		
Maintainer Training (23,24)	T/S Only											X (Job)		
Upgrade/Skill Progression Training														
Individual Operation Training (6,7,18)	X											Limited		
Collective Operation Training (33,34)	X											Limited		
Maintainer Training (25)	T/S Only											X (Job)		
Positional Cross-Training														
Individual Operation Training (8,9)	X											Limited		
Collective Operation Training (35,36)	X											Limited		
Functional Area Training														
Systems Utilization Sustainment (40)		X										X		
Force-Level Training														
Combined Arms Systems Utilization Sustainment (42)		X										X		

- * Includes all types of Stand-Alone Training Devices (SADs) used for training equipment operation and utilization at a single crew position, but excluding team or crew trainers (e.g., driver trainers, precision gunnery trainers, equipment operation trainers)
- ** Includes all use of actual equipment, not utilizing ET capabilities, for training – including drills, exercises, range firing, etc. – and comprehends the possible use of engagement simulation devices and equipment such as MILES, WEISS, Hoffman device, etc.
- *** Includes all SADs which are used to train crews or crew subsets in specific functional or task areas (e.g., COFTs, crew trainers); also includes command group training simulations and SIMNET
- † Abbreviations for position titles: D - Driver; CC - Assault Vehicle Commander; SC - Support Vehicle Commander; DG - Direct Fire Weapons Gunner; IG - Indirect Fire Weapons Gunner; SO - Sensor Operator; MO - Mission Equipment Operator; BT - Commanders and Battle Staff

Figure 7. Training System Concept Summary Matrix for the
AFV Rocket and Missile System Vehicle

Institutional Training

Pipeline and Replacement Training. Institutional system operator and crew training is supported by a driver trainer (generic AFV or generic medium chassis driver trainer) and an indirect fire weapons gunner trainer. Limited exercise-based actual equipment training is used for crew drills and tactical training ("how to fight").

Maintenance training for all levels of maintenance is supported by maintenance trainers and the use of actual equipment for familiarization with system anatomy and geometry.

Leadership and Management Training. Any on-equipment training for NCO and officer courses is supported by actual equipment training and possible minor use of ET. Hands-on maintainer training in this context is supported by maintenance trainers and actual equipment training. Command group training may be supported by networked simulations, if this type of training is provided for this system.

Fielding Site Training

Individual and collective crew training at the AFV fielding site is supported by ET and the same type of driver trainer used for institutional training. Limited exercise-based actual equipment training is used to support tactical utilization skills development.

Maintainer training (for all levels) at the fielding site is supported by the same types of maintenance trainers used for institutional training. ET also supports maintenance training for troubleshooting and fault isolation. Actual equipment training also supports fielding site maintenance training.

Unit Training

Individual and crew sustainment, upgrade, and cross training is supported by ET and limited exercise-based actual equipment training. "Netted" ET may be used to support collective training above the crew level.

Maintenance training for all levels of maintenance is supported by ET (for troubleshooting and fault isolation) and by practice in maintaining the actual vehicle and mission module systems.

Functional area and force-level training are supported in the unit by conventional exercise-based training. There is also the potential of using "netted" ET, possibly interfaced or networked with command group simulations, to support these types of training.

Training System Concept for the AFV Armored Escort/Security Vehicle

The AFV Armored Escort/Security Vehicle (ASV) will differ significantly from most other AFV vehicles. A principal difference is that this vehicle will be wheeled, rather than tracked. The mission role of the ASV is to provide escort for truck transports and to provide field Military Police teams the ability to engage light forces. The vehicle will be armed with, at a minimum, a rapid-firing light cannon with an integrated day night capable fire control system. Some sources also describe this vehicle as equipped with an antitank guided missile (ATGM) capability. Night vision equipment will be provided for all crew positions. Crew complement is expected to be three: driver, direct-fire weapons gunner, and vehicle commander. Vetrionics capability in the ASV will be common with other vehicles with direct-fire weapons fire control systems.

The training system concept summary matrix for ASV is depicted in Figure 8. As noted, Embedded Training is a preferred alternative for fielding site and unit training, but not for institutional training. Training requirements analysis data for the ASV vehicle is presented in Appendix J.

Institutional Training

Pipeline and Replacement Training. Institutional training for operators and crews will be supported by a mix of positional trainers (driver and direct fire weapons gunner), exercise-based actual equipment training, and possibly a Conduct of Fire Trainer for coordinated commander gunner precision gunnery training. If a COFT is developed for ASV, the positional gunner trainer will not be required, since the capabilities of a COFT duplicate those of the positional trainer.

Maintainer MOS training for all levels of maintenance will be supported by maintenance trainers and familiarization use of actual equipment.

Leadership and Management Training. Any on-equipment training for NCO and officer courses is supported by actual equipment training and possible minor use of ET. Hands-on maintainer training in this context is supported by maintenance trainers and actual equipment training. Command group training may be supported by networked simulations, if this type of training is provided for this system.

Fielding Site Training

Fielding site crewmember training is supported by ET, the same positional trainers as used in the institution (or the driver trainer and the COFT), and limited exercise-based actual equipment collective training.

AFV Armored Escort/Security Vehicle
Training System Concept

FV Armored Escort/Security Vehicle Training System Concept			Hand-On Training Support Approaches										
Training Situations and Sites	System ET	Netted SIMNET	Positional Trainers*†								Actual Equipment (No ET)**	Team/ Crew Trainers***	Maintenance Trainers
			D	CC	SC	DG	IG	SO	MO	BT			
INSTITUTIONAL TRAINING													
Pipeline/Replacement Training													
Individual Operation Skills Aquisition (1,2,3,13,14,15)			X			X					Limited		
Collective Operation Skills Aquisition (28,29,30)											Limited	POSS COFT	
Maintainer Skills Aquisition (19,20,21,22)											Fam. Only		X
Leadership/Management Training	Minor										Limited	POSS COFT	
Crewmembers (12)											Limited		X
Maintainers (27)		SIMNET									Limited		
Commanders, Battle Staff (29,31)													
FIELDING SITE TRAINING													
New Equipment/Transition Training													
Individual Operation Training (10,11,13,14,15)	X		X			X					Limited		
Collective Operation Training (37,38)	X										Limited	POSS COFT	
Maintainer Training (26)	T/S Only										X		X
UNIT TRAINING													
Sustainment Training													
Individual Operation Training (4,5,16,17)	X										Limited		
Collective Operation Training (31,32)	X	NET-ET									Limited	POSS COFT	
Maintainer Training (23,24)	T/S Only										X (Job)		
Upgrade/Skill Progression Training													
Individual Operation Training (6,7,18)	X										Limited		
Collective Operation Training (33,34)	X										Limited	POSS COFT	
Maintainer Training (25)	T/S Only										X (Job)		
Positional Cross-Training													
Individual Operation Training (8,9)	X										Limited		
Collective Operation Training (35,36)	X										Limited	POSS COFT	
Functional Area Training													
Systems Utilization Sustainment (40)		X									X		
Force-Level Training													
Combined Arms Systems Utilization Sustainment (42)		X									X		

* Includes all types of Stand-Alone Training Devices (SADs) used for training equipment operation and utilization at a single crew position, but excluding team or crew trainers (e.g., driver trainers, precision gunnery trainers, equipment operation trainers)

** Includes all use of actual equipment, not utilizing ET capabilities, for training – including drills, exercises, range firing, etc. – and comprehends the possible use of engagement simulation devices and equipment such as MILES, WEISS, Hoffman device, etc.

*** Includes all SADs which are used to train crews or crew subsets in specific functional or task areas (e.g., COFTs, crew trainers); also includes command group training simulations and SIMNET

† Abbreviations for position titles: D - Driver; CC - Assault Vehicle Commander; SC - Support Vehicle Commander; DG - Direct Fire Weapons Gunner; IG - Indirect Fire Weapons Gunner; SO - Sensor Operator; MO - Mission Equipment Operator; BT - Commanders and Battle Staff

Figure 8. Training System Concept Summary Matrix for the
AFV Armored Escort/Security Vehicle (ASV)

Maintainer training for all levels of maintenance at the fielding site is supported by the same maintenance trainers used for institutional training and by on-equipment practice. Troubleshooting and fault isolation training are supported by ET, possibly connected to external test equipment.

Unit Training

Individual operator and crew training (sustainment, upgrade, and cross-training) is supported by a mix of ET, COFT (if a COFT is developed), and limited exercise-based actual equipment training. "Netted" ET may be utilized for collective training above the crew level.

Maintenance training from the unit level to General Support is supported by ET (for troubleshooting and fault isolation) and by practice in maintaining the actual vehicle and mission module systems.

Functional area and force-level training are supported in the unit by conventional exercise-based training. There is also the potential of using "netted" ET, possibly interfaced or networked with command group simulations, to support these types of training.

"Umbrella" AFV Training System Concept

The "umbrella" training system concept summary matrix for AFV is presented in Figure 9. As is apparent from this matrix, Embedded Training plays a major role in AFV training overall at the fielding site and in unit training, but a minor role in institutional training.

It should be noted that, under the AFV fielding concept, the total training systems for all AFV vehicles (including fielding site training, institutional replacement training, and unit training) must be in place and ready for training at the first introduction of AFV vehicles to a brigade. Furthermore, coordinated training must take place across entire units (and all vehicles), to ensure that not only system operation and utilization skills, but "how to fight as a unit" skills, as well are developed in AFV-equipped units.

Institutional Training

Device-based training for both individual crew positions (driver, gunner, and sensor/mission module operators), for team/crew training (principally COFTs for precision gunnery training), and for maintenance training, is emphasized for institutional training. Where hands-on training is required for operator and maintainer leadership and

AFV Overall Training System Concept

AFV Overall Training System Concept			Hand-On Training Support Approaches											
Training Situations and Sites	System ET	Netted ET/SIMNET	Positional Trainers*†									Actual Equipment (No ET)**	Team/ Crew Trainers***	Maintenance Trainers
			D	CC	SC	DG	IG	SO	MO	BT				
INSTITUTIONAL TRAINING														
Pipeline/Replacement Training														
Individual Operation Skills Aquisition (1,2,3,13,14,15)			x	N/A	N/A	x	x	x	x		Limited			
Collective Operation Skills Aquisition (28,29,30)											Limited	x		
Maintainer Skills Aquisition (19,20,21,22)											Fam Only		x	
Leadership/Management Training														
Crewmembers (12)	Minor										Limited	x		
Maintainers (27)											Limited		x	
Commanders, Battle Staff (39,41)		SIMNET									Limited	x (Staff)		
FIELDING SITE TRAINING														
New Equipment/Transition Training														
Individual Operation Training (10,11,13,14,15)	x		x			x	x	x	x		Limited			
Collective Operation Training (37,38)	x										Limited	x		
Maintainer Training (26)	T/S Only										x		x	
UNIT TRAINING														
Sustainment Training														
Individual Operation Training (4,5,16,17)	x		x			x								
Collective Operation Training (31,32)	x	NET-ET									x	x		
Maintainer Training (23,24)	T/S Only										x (Job)			
Upgrade/Skill Progression Training														
Individual Operation Training (6,7,18)	x										Limited			
Collective Operation Training (33,34)	x										Limited	x		
Maintainer Training (25)	T/S Only										x (Job)			
Positional Cross-Training														
Individual Operation Training (8,9)	x										Limited			
Collective Operation Training (35,36)	x										Limited	x		
Functional Area Training														
Systems Utilization Sustainment (40)		x									x			
Force-Level Training														
Combined Arms Systems Utilization Sustainment (42)		x									x			

* Includes all types of Stand-Alone Training Devices (SADs) used for training equipment operation and utilization at a single crew position, but excluding team or crew trainers (e.g., driver trainers, precision gunnery trainers, equipment operation trainers)

** Includes all use of actual equipment, not utilizing ET capabilities, for training – including drills, exercises, range firing, etc. – and comprehends the possible use of engagement simulation devices and equipment such as MILES, WESS, Hoffman device, etc.

*** Includes all SADs which are used to train crews or crew subsets in specific functional or task areas (e.g., COFTs, crew trainers); also includes command group training simulations and SIMNET

† Abbreviations for position titles: D - Driver; CC - Assault Vehicle Commander; SC - Support Vehicle Commander; DG - Direct Fire Weapons Gunner; IG - Indirect Fire Weapons Gunner; SO - Sensor Operator; MO - Mission Equipment Operator; BT - Commanders and Battle Staff

Figure 9. AFV "Umbrella" Training System Concept Summary Matrix

management training, it is supported principally by actual equipment training, with minor use of ET. Institutional training for commanders and battle staff is supported by actual equipment training and command group simulations, possibly interfaced by such means as SIMNET with "netted" ET.

Fielding Site Training

A mix of ET and device-based training supports fielding site training. Devices supporting fielding site training include driver and gunner/mission module operator trainers, as well as team/crew trainers (again, principally COFTs for precision gunnery training). Maintenance trainers and actual equipment practice support maintenance transition training at the fielding site. ET supports individual and crew level transition training, as well as maintenance troubleshooting training.

Unit Training

Unit training is principally supported by individual and crew-level "system" ET, and limited exercise-based actual equipment training. ET is used for maintenance troubleshooting and fault isolation training in the unit. "Netted" ET is utilized for collective training above the crew level. Functional area and force-level combined arms training are supported by exercise-based training and command group simulations, possibly interfaced with "netted" ET.

SECTION 4

DISCUSSION

The conceptual AFV training system concept outlined in the previous section will, if realized, provide effective and comprehensive training at all levels and in most training situations. There are a number of significant issues whose resolution may affect the extent to which this concept can be realized in practice. These issues are discussed in the subsections that follow.

Embedded Training and Training Device Capabilities

ET occupies a major role in this concept, supporting training in both the fielding site and unit settings. Of the notional functions and tasks which are candidates for training provided through ET, many will require high-fidelity visual imagery to enable effective training to take place. For example, battlefield surveillance and engagement simulation are expected to require a high degree of fidelity in simulated visual imagery to replicate the visual environment of the battlefield. Also, a very high degree of variability and variety may be needed in training scenarios (and, thus, imagery) to provide effective training on such tasks.

This level of visual imagery simulation requires considerable computational power, memory and mass storage, and specialized software to provide. SADs frequently utilize the capabilities of one or more dedicated super-minicomputers and elaborate optical image presentation systems to provide high fidelity, real-time adaptive computer-generated imagery. Miniaturized computer-generated imagery (CGI) technology is maturing toward a capability to mount high-fidelity, high-resolution CGI capabilities on military vehicles. However, the overall maturity of this technology in a time frame suitable for introduction in the mid-1990's in AFV is questionable. Also, the compatibility of CGI software with AFV vetronics processors remains to be established.

The extent to which CGI technology matures in this fashion will have a major influence on the extent to which a predominantly embedded training strategy is feasible for AFV. Most tasks for many of the AFV vehicles can be trained without high-fidelity imagery. Such tasks are high priority candidates for inclusion in AFV ET components. However, when generated imagery is required, it is indispensable for effective embedded or device-based training.

The maturity of miniaturized CGI technology may influence the manner in which ET is introduced as an element of AFV training. Early generations of AFV vehicles may lack CGI capabilities as elements of their ET components. Task training requiring high-fidelity, real-time visual imagery could be provided in such a case by two means: (1) SADs (with the required visual simulation capabilities) to supplement ET for such training; and (2) greater utilization of OPTEMPO exercise training. Either of these approaches involves additional costs and resources compared to a completely embedded strategy.

As miniaturized CGI capabilities mature, CGI can be embedded in AFV vehicles as a P3I. However, this should occur as a managed process. The AFV Task Force has indicated that P3Is for AFV computational systems will occur at approximately five-year intervals, to take advantage of emerging technology. CGI integration should form a key element of P3I planning for AFV training, to enable a highly embedded strategy to be pursued.

An allied issue is the presentation of visual imagery (whether or not computer-generated) to AFV crewmembers as an element of ET. In order to maximize training transfer to actual system use, it is highly desirable to use the normal SSI suites of AFV systems to present visual imagery for training purposes. In the case of indirect visual systems (e.g., thermal imagery), this is a relatively minor issue, and can be addressed by supplying appropriate synthesized video signals to the display device(s) used by crewmembers, to generate images. In the case of direct-view optical systems or head-out (unbuttoned) conditions, a somewhat larger issue arises. Here, a means must be supplied for integrating the visual imagery into optical sights (e.g., an alternate optical path) or providing a medium on which to project imagery (e.g., a visual system enclosure of some sort). Candidate solutions for providing direct-view visual imagery must be developed from existing or maturing technology and traded off for training benefits versus cost and engineering risk during detailed development of ET for AFV. This will require close and continuous coordination between SSI designers, training proponents, and more general engineering design functions during continued AFV development.

Software and Training Courseware Commonality

From the training system concept presented in this report, it is evident that a considerable variety of both SAD and ET capabilities may be needed to effectively introduce and sustain the AFV-equipped force. It is anticipated that all AFV vetronics suites will have a high degree of commonality in hardware (processors, mass storage, etc.), languages, and operational programs. This commonality should also be carried through in Embedded Training software and courseware, across chassis types and mission modules, to the extent possible. A very significant savings or cost avoidance may be realized if software and courseware

commonality can be achieved for ET. There is also a potential to conduct common development of scenarios and training approaches across vehicle types requiring similar training implementation (e.g., tasks and stimulus requirements). This may lead to even greater life-cycle cost savings or avoidance for AFV.

The concept of training software and courseware commonality may also extend to SADs developed to support AFV training. This would require that processors and languages (e.g., Ada) that are highly similar to those used in AFV common vetronics be used in the computational systems of AFV SADs. There appears to be a significant potential for common software and courseware utilization for training similar tasks at different training sites that require different support approaches. For example, the software that supports presentation of high-fidelity visual images on a precision gunnery trainer used in the institution could also be used (with suitable changes in implementation details) to present similar imagery on hunter-killer sights in the vehicle in-unit (as ET).

"Netting" ET and Other Training Approaches

The concept of providing collective training above the crew level (e.g., force-on-force) through "netting" ET is reflected in the AFV training system concepts presented above. This concept also extends to the potential for "netting" different types of training simulations for combined arms or command and control training. These concepts are not new ones. Current work on the SIMNET concepts indicates that there may be significant potential for such approaches.

Caution should be exercised, however, in adopting such capabilities as near-term elements of the AFV training system. There may be a requirement for real-time Wide-Area Networks (WANs) in the implementation of such concepts. This has not yet been established as within the state of the art in telecommunications or computing. These concepts may possibly have to be deferred (as a potential P3I) until later technological advances to support their implementation have been achieved.

Risk Factors for Consideration in Defining the Ultimate Role of ET in the AFV Training System

The inclusion of ET in a training strategy for the AFV is not without risk, primarily because experience with this approach to training is so limited at this point in time. The purpose of this subsection is to describe and discuss the risks associated with ET for

the AFV and to identify the consequences of failure to achieve design goals. The subsection begins with a discussion of overall program risks, then focuses on technical risks, and finally on cost risks.

Program Risks

ET is attractive to the training developer for two principal reasons. First, it is an alternative to such approaches as classroom, device-based, drill-based, and field training. Second, it provides a means of delivering training in settings beyond those currently used. The payoff associated with the first reason is cost effectiveness, in particular the savings realized from reducing OPTempo: fuel, ammunition, and wear and tear on the prime systems used in hands-on training. As an alternative to training devices, ET should also contribute to savings in military construction and operations and maintenance, but the magnitude of these savings is small compared to those associated with fuel, ammunition, and repair and maintenance incurred by use of the prime system in the field, and both ET and SADs should offer similar savings in this area. The utility of delivery of training in new settings or situations; e.g., in the field during lulls in an FTX or on or near the battlefield during war is less amenable to quantification at the present time. Moreover, while the payoffs may be significant, the costs are not. In essence, then, the value of ET is best measured in the context of reductions in the costs incurred by the use of prime systems in the field. Recognizing that SADs constitute a somewhat similar alternative, the choice between ET and SAD must also be examined, leading to comparison of costs and training effectiveness.

ET and SADs have been proposed as means of providing training at the individual, crew/team, functional subsystem, and combined arms levels. The payoff is held to be reductions in the use of prime systems in the field. What are the consequences of failure to achieve the training effectiveness goals? If ET is the alternative in question, it is possible that SADs can be modified or developed to fill the void. If ET and SADs are the alternatives in question, then it is likely that the trainer will have to fall back on use of the prime system. The key issue therefore is the risk associated with training effectiveness.

Experience to date suggests that ET and SAD can be used to provide familiarization and as a host for computer-based instruction systems for programmed or self-paced instruction. The use of conduct of fire trainers, gunnery trainers, maintenance trainers, etc., also provide evidence that ET and SADs contribute to training for more complex knowledge and skills. However, the extent to which these conceptual training system elements complement or are a substitute for range time, situational training exercises, and field training exercises is not clear. The question of the reductions in time in the field and rounds fired resulting from use of a COFT or ET has not yet been answered. In

the extreme, ET or SADs could complement training provided during driving time, or live fire exercises, etc., but not appreciably reduce the time or rounds required to maintain proficiency.

ET or SADs for functional area and combined arms training are less susceptible to the arguments outlined above. Training devices such as SIMNET, ARTBASS, etc., provide opportunities that cannot be otherwise made available. JESS and the NTC/JRTC are additional examples of training systems which fill such roles. Nonetheless, at platoon and company level, the tradeoffs between simulator training and field training have not yet been fully quantified. At all levels, the degree to which simulator training reduces the requirement for field training has not been definitively determined.

The selection of ET (or SADs) at this time should be made with care, particularly if funds hitherto programmed for training are to be allocated elsewhere. While the cost of either alternative may be relatively small, the consequences of failure to achieve design goals is reliance on training in the field with costs comparable to those expended today. ET or SADs may be a substitute or a complement, and may be a major or a minor contributor to reduced costs. There is a risk that the latter case will be true.

Technical Risk

Technical risk is taken to mean the likelihood that the state of the art in some training technology, either current or anticipated, will not support the objectives selected for an ET subsystem of the overall training system. It is clear that there are technical risks associated with ET for the AFV; some are much more significant than others.

Computational Capacity and Storage. It is clear that if current trends continue, the cost of computational capacity and storage will decrease, in the sense that both funds and other resources required such as power, weight, and volume will be reduced. Certainly in these terms, the state of the art in processors, interactive video disks, optical storage, etc., will support familiarization and self-paced or computer-based instruction. It is not so clear that, within the near term, available processors and storage will support the full spectrum single station or multistation high fidelity hands-on practice or more complex training for the complete range of possible applications in the AFV. Full fidelity visual input is an example of possible training need compromised if this capacity is not available. A possible response to this situation is to use less fidelity in training and there is at least partial evidence that this is effective. Nonetheless, the requirement for full fidelity at some point in the curriculum may remain valid, but not fully quantified. An "on-board COFT" may be 10 years from deployment. An on-board SIMNET or ARTBASS is almost as demanding and may be an equal period from deployment.

Interactive Dynamic High Fidelity Imagery. Provision of interactive dynamic imagery at high levels of fidelity, be it direct vision, LLLTV, or thermal, currently is one of the cost drivers of systems such as the M-1 COFT, in terms of the computer power (processing and storage) required. While it is possible with current state of the art to replicate displays that use symbology, text, or graphics requiring high fidelity (e.g., "indirect" vision, workstation displays, etc.), dynamic interactive imagery simulating direct view of the environment would stress the technology if full embedded training was required. Embedded training is likely to be able to satisfy some, but not all needs for visual imagery for training purposes.

Synchronizing the views of several different trainees would further complicate the task. Visual cues and input are significant. While there is training value to lower fidelity, at some point and to some extent high fidelity imagery is likely to be required. Relying on ET to supply such in the near term creates a reasonable degree of risk, unless fairly large computers are available. Future advances may alleviate this risk. Nevertheless, this is a risk in the near term.

Shock, Acceleration. For the variants of the AFV, soldiers in an operational environment will be subjected to varying degrees of physical forces including, for example, recoil, roll, pitch and yaw caused by movement, and those caused by turret rotation or other movement of system components. At some point, the trainee must become acquainted with performing to standard in this environment, which in many respects is difficult to deliver with ET. In particular, operation of the mechanical subsystems during ET will incur fuel and maintenance costs and possible safety risks, which must be balanced against OPTEMPO savings. Overcommitment to ET without fully understanding the need to train in an operational environment creates a degree of risk, moderate but nonzero, that additional time on system will be required. (In this regard it should be noted that components such as interactive video disks constructed to withstand the rigors of OPTEMPO are not yet available; i.e., shock, acceleration, and vibration present hardware problems).

Networking. Collective training requires networking: on a single vehicle for a crew or team, on multiple vehicles for functional systems or combined arms teams. While it is clear that the COFTs support the claim that on a single vehicle the state of the art will suffice, the evidence is not as strong for SIMNET, ARTBASS, or JESS. In fact, progressively larger portions of development software and hardware are necessary in these systems to net the workstations together. This is even more significant in the case of the facilities of the National Training Center. In the immediate future, networking a platoon of tanks or IFVs with embedded software and hardware presents a moderate degree of risk--particularly in terms of the coordination and control of visual stimuli.

Software/Courseware. The goals of any training system include:

1. clearly defined training objectives;
2. valid measurable standards of performance;

3. measurement of performance and progress;
4. diagnosis of causes of problems;
5. adaptivity to the trainee and his/her/their level of performance;
6. clear and timely feedback; and
7. recordkeeping for training management.

Implementation of functions which address these goals in software for ET presents varying degrees of risk, depending upon the complexity of the tasks being trained. The use of simulations is of particular significance in this regard. In essence the simulations used in current COFT-type trainers are two sided, with a simulated enemy. SIMNET is two sided, but uses (for most applications) players for both friendly and threat elements. Larger scale simulations and trainers such as ARTBASS and JESS make extensive use of controllers and players to produce an appropriate dynamic scenario. A variety of hardware and software designs could make SIMNET- and ARTBASS-type training available for personnel at their workstations, supported by strap-ons, or use of such systems as BCS. However, the presence of controllers and OPFOR players detracts somewhat from the availability and cost attributes of ET. For example, scheduling a training session at the functional level would require assembling (and training) controllers and OPFOR players. Until effort is expended to simulate OPFOR elements realistically, full embedded training will not be possible. Similar efforts must be focused on designing and implementing software for diagnostic and adaptivity functions which an experienced instructor performs easily. The appropriate indicators and symptoms must be identified and trapped, and the algorithms and heuristics which select feedback and remediation must be developed. The likelihood that such efforts will be unsuccessful is not large, but the efforts themselves will consume resources and require time. Moreover there is some risk that such routines will tax computational resources.

Cost Risks

To a large extent, the major cost risks associated with ET for the AFV are related to failure to achieve effective training capabilities and consequently the unanticipated requirement for OPTempo. Based on recent experience, it is possible to estimate elements of the life cycle cost of ET with reasonable confidence. For other elements some uncertainty is present.

Development. The development of courseware and software for ET for a single variant of the AFV can be estimated to cost between two and three million dollars in today's funds. This would include the task analyses and training analyses necessary regardless of what training approach is adopted, and the development of courseware. Assuming that a common authoring system is used to develop software and

that there are common tasks among variants suggests that certain economies will be achieved. It should also be noted that once a decision is made to provide ET for one task, the marginal cost of including other tasks may be relatively low. Finally, provided the necessary software configuration decisions are made, large elements of courseware and software should be common to both ET and SADs.

Procurement. The hardware necessary to support ET may range from on-board operational subsystems to specific ET devices, for example an IVD. It is unlikely that such hardware will cost more than \$10,000 per vehicle.

It should be noted that the inclusion of ET on a system typically increases the frequency of use of elements of the soldier system interface; this may require procuring more robust components to maintain operational availability and avoid maintenance and repair.

Military Construction. ET should incur minimal levels of military construction, apart from the possible development of facilities for Post-deployment Software and Courseware Support.

Fielding. Properly designed, the cost of fielding ET is minimal at best.

Operations and Support. Operation and support costs of ET depend on a number of factors. First, the ET subsystem itself will require repair and maintenance. Provided that common components are chosen and integrated with VETRONICS, this cost should not be large. The operation of ET will, however, contribute to wear and tear on the prime system. To a large extent, the costs will depend upon the extent to which mechanical subsystems are activated (e.g., turret rotation). These costs cannot be precisely estimated in advance, but once lessons, courseware, and training cycles are specified, standard techniques can be applied and the resultant costs compared to savings from reductions in OPTEMPO. Similarly fuel requirements, etc. can be estimated.

Strictly speaking, in a full-up ET system no personnel costs should be incurred. However, if specific personnel for controllers or OPFOR (e.g., as at NTC) are included in the concept, the associated costs should be estimated and included.

REFERENCES

Kaplan, J.D. and Crooks, W.H. (1980). A concept for developing human performance specifications. Aderdeen, MD: U.S. Army Human Engineering Laboratory.

APPENDIX A

ASSUMPTIONS FOR THIS ANALYSIS

Since this effort has taken place in advance of specific information about detailed design of the AFV chassis and mission modules, a number of assumptions have been made. The results of this effort must be considered in light of these assumptions. A discussion of all of the major assumptions made in the course of this analysis follows.

Soldier-System Interface (SSI) and Task Functional Allocation

Considerable difficulty has been experienced in developing an accurate picture of the functional performance allocations between soldiers and the various AFV systems because of the existence of three Best Technical Approach (BTA) study contracts in addition to TACOM's BTA effort. This has led to a certain degree of caution on the part of contractors in sharing detailed data for use in this effort. Thus, the Soldier-System Interface (SSI) characteristics of AFV vehicles and the performance and training requirements assumed from characteristics of the SSIs must be regarded as notional.

Computer Processor and Memory Capacity

The assumption has been made that proposed processor and memory capabilities will enable an advanced information display capability similar to multifunction displays and mission adaptive controls found in modern avionics, as an element of the avionics of the AFV vehicles. This capability is assumed to be common to all mission modules as well as the basic AFV chassis types.

Integrated Displays for Equipment Functions

The assumption has been made that many display and control functions conventionally served by individual pieces of interface equipment (e.g., radios, status displays, caution and warning displays, map displays threat warning displays, etc.) will be combined on one or more

multifunction displays per crewmember SSI. This specifically excludes displays, equipment, and controls related to out-of-vehicle vision and target acquisition and engagement for direct fire weapons.

External Vision for Crewmembers

A primary direct-view visual system is assumed for all crew positions requiring outside vision for task performance. Some of the BTA contractors have tentatively proposed an indirect view (mediated) visual system. This is considered questionable in terms of enabling visual task performance, except where specific sensors may be utilized for target surveillance and acquisition (e.g., thermal imaging sensors, Low-Light Level Television [LLTV], or imaging laser or radar sensors [considered unlikely in the near term]). The reasoning behind this assumption is that current visual sensor and display technology significantly and, perhaps, critically reduces brightness contrast, color contrast, resolution, and perspective cues in displayed images, especially static images. This reduction results in a displayed image that is probably less than adequate for battlefield surveillance and target acquisition and engagement by direct fire weapons.

Embedded Training as an Evolutionary Capability in AFV Vehicles

Embedded Training (ET) implemented through vehicle vetronics is assumed. However, it is assumed that the attainment of the ultimate ET capability will be evolutionary, rather than revolutionary. The ability to support the ultimate ET capabilities envisioned (including out-the-window-cum-sight visual stimulation for engagement simulation and battlefield surveillance) must be designed into the vetronics architecture and capabilities from the very outset of system design. It is expected, however, that training development and delivery capability in areas requiring on-vehicle visual environment task simulation (e.g., adequate visual scenarios to support such tasks) will lag behind the strictly engineering capability to generate and present imagery. The technology to support this type of stimulus presentation may be nearly mature, but the training capability probably is not. This implies at least two and, more likely, several, generations of ET evolution for AFV. Since Preplanned Product Improvement (P3I) computer updates are anticipated for AFV at approximately 5-year intervals, this may represent a significant opportunity to preplan product improvements in the ET area as well, coupled with the computer update cycle.

Embedded Training Suitability for Hands-on Task Training

Embedded Training (ET) is considered to be generally less suitable than dedicated training devices of equivalent training capability for initial equipment operation and utilization skills acquisition conducted in the institution. This is due to the implied requirement to provide sufficient copies of the actual equipment with ET capability to support hands-on training in the institution. It is suspected that formal cost trade studies will support this assumption.

Pipeline (Replacement) Training Characteristics

Pipeline (e.g., replacement) institutional training will continue the historical practice of training a majority of critical skills to a minimum entry-level performance criterion. Institutional training is thus assumed to prepare the soldier to take advantage of on-the-job training opportunities in the unit of assignment. Little, if any, advanced skill training will take place in Basic Combat Training/Advanced Individual Training (BCT/AIT), One Station Unit Training (OSUT), etc.

Ability to Embed Training and Embedded Training Applications

It is assumed that Embedded Training (ET) has not and will not in the general case be ruled out for AFV systems, and the engineering capability to integrate ET exists. ET will be used to support some subsets of skill upgrade, sustainment, and collective (crew/team) system operation and tactical utilization training (with simulation capabilities or netting), as well as within-crew cross training and system transition training. Some subset of both crew and maintainer-MOS fault isolation and troubleshooting training will also be supported by ET capabilities. ET capabilities of similar or dissimilar types will be able to be "netted" to support force-on-force engagement simulation and mutual stimulation of command group and forces when training in coordinated training events. The extent to which ET is actually developed to support these types of training depends upon specific actions during the system acquisition process to: (1) ensure that sufficient processor, memory, and mass storage capability, as well as needed interfaces with vehicle controls and displays, is available to support ET; and (2) ensure timely and appropriate identification of ET requirements, generation of ET design concepts, and development of ET software and courseware in close association with system development.

The principal general role of ET is envisioned to be the provision of system operation and utilization skills training for the purposes of skill sustainment, upgrade training, within-crew positional cross training, and transition training (to include hands-on elements of New Equipment Training [NET]) for individual crewmembers and vehicle crews. A secondary, but highly important, role for ET (achieved through "netting" of individual vehicle ET components) will be collective training above the crew level (e.g., squad, section, platoon, battery), and command and control training for lower echelon commanders (e.g., squad or section leaders, platoon leaders and sergeants; implemented through communication of simulated activities during training at the vehicle level to command echelons). On-board direct ET capabilities for a mission module/vehicle are assumed not to apply (except for "netting" capability) above the organizational level where the specific mission module/vehicle variant is used.

Combined-arms (above Platoon, or possibly Company, level) and force-level training is assumed not to require ET integration at the system level, other than assuring that the capability exists to "net" ET in some fashion, or provide the results of training activities to commanders or staff at above-Company level on a real-time or non-real time basis. This means that there must (when needed) be an interface of some sort between training capabilities on the actual tactical systems (at least for reporting activities during training) and commanders and staff above Platoon or Company level. Such an interface may be unidirectional or bidirectional, as required.

The most effective use of ET for maintenance training is to develop and sustain (and, perhaps, upgrade) fault isolation and troubleshooting skills for both crewmembers and dedicated-job maintainers. The capabilities afforded by ET in this area complement Built-in Test/Built-in Test Equipment/Plug-in Test Equipment (BIT/BITE/PITE) capabilities. In other words, ET should have the capability to be a fault symptoms simulator and perhaps a diagnostician of the maintainer's troubleshooting activities. Feedback or job aiding might be provided by the same means as presentation of other ET. This could be manifested as either direct maintenance training (for the principal purpose of training troubleshooting and fault isolation skills) or as a component of system operations training (learning to operate with degraded modes or failure of some system capabilities).

Conceptually, ET can be used to support training for all levels of maintenance from crew to General Support. In general, many of the same functions (at least from a troubleshooting and fault isolation standpoint) may have to be trained at all maintenance levels. While there may be some differences in the Test, Measurement, and Diagnostic Equipment (TMDE) used at various levels, ET might conceptually be used as a fault symptoms simulator for more than one level of maintenance. Tradeoffs in later definition of ET roles to support maintenance training will identify the differential roles of ET (if any) across levels of maintenance.

Hands-on Maintenance Training

It is assumed that hands-on maintenance skill acquisition and sustainment (e.g., all of the maintenance activities other than troubleshoot and fault isolate) is best supported by either maintenance trainers (a preferred alternative) or practice on the actual equipment (when there is no other way). For difficult, rare, or highly complex maintenance task skill acquisition or sustainment, a dedicated maintenance training capability in units is highly desirable. In some cases, portions of such training could be provided by ET in a two-dimensional visual simulator mode. This function might well be accomplished through provision of on-board Electronic Information Display System (EIDS) capabilities, with suitable training software and courseware. EIDS might also be a general support medium for ET.

Training Device and ET Simulation Fidelity

In cases where criterion task performance requires high-fidelity visual imagery (e.g., engagement simulation with target classification; battlefield surveillance, etc.), combat fidelity should be thought of as the criterion for visual simulation. Lesser degrees of task-procedural, physical, stimulus, or response fidelity are appropriate for many other training situations (e.g., acquisition, maintenance training, etc.). The criterion objectives for trainee performance in a given training situation must be the drivers for fidelity needs. Therefore, the maximum fidelity requirements for a given situation must be based on what the trainee is expected to be able to do in performing the terminal objectives of training.

Stand-Alone Training Devices Consideration

All varieties of existing stand-alone training devices have been considered in the analysis and development of the training system concept for AFV. The present training system roles of stand-alone devices are modified to some extent (varying with case) by the presence and assumed capabilities of ET.

APPENDIX B

DEFINITION OF TERMS

In this analysis, a number of terms and concepts are used with specific meanings that may differ somewhat from standard usage. In order to prevent misinterpretation of what is intended in this report, definition of such terms follows.

Embedded Training

Embedded Training (ET) is defined as training provided by capabilities intentionally incorporated into a materiel system that support the presentation of task stimuli to and performance of appropriate responses by system operators and (in some cases) maintainers. Embedded Training is accomplished through the normal Soldier-System Interfaces (SSIs) of a system. Embedded Training ideally includes comprehensive performance sensing, measurement, and feedback capabilities. Also, performance recording and reporting capabilities are included in an idealized Embedded Training capability, to support training management and prescription. When present, comprehensive performance measurement capability also supports the use of Embedded Training for assessing qualification and, in some cases, certification of ability.

Embedded Training may either be entirely integral to a unit of issue materiel system (fully integrated), or may consist of some capabilities integral to the unit of issue system augmented by capabilities afforded by additional equipment that is interfaced with the system (strap-on or adjunct). For purposes of this analysis, the two types are not distinguished.

Embedded Training may be provided for individual crewmembers or crews (system ET), or may be networked ("netted") with other ET components in similar or dissimilar type systems to provide collective training above the crew level.

Stand-Alone Training Devices (SAD)

Stand-Alone Training Devices (SADs) are items of equipment which replicate some or all of the characteristics of actual equipment or materiel systems to some level of fidelity in order to enable training and practice without use of the actual equipment. SADs are used only for training purposes. The level of fidelity represented by a SAD

varies with the stimuli and responses required for training and with task performance criteria. For this analysis, several types of SADs are considered:

1. Positional trainers are devices which replicate the characteristics of one operator crew position or Soldier-System Interface (SSI), and are used to train tasks peculiar to the position replicated that do not require collective performance. Notionally, some positional trainers may simulate stimuli or communications from other crew positions or external sources such as command and control nets.
2. Crew/team trainers are devices which replicate the characteristics of multiple operator crew stations or SSIs, and are used to train crew or crew-subset level collective tasks.
3. Maintenance trainers are devices which replicate maintenance-relevant characteristics of a system or of one or more subsystems of a unit of issue materiel system, and in some cases also replicate relevant characteristics of generic or peculiar test equipment. Maintenance trainers are used to train maintenance personnel to perform troubleshooting, fault isolation, servicing, and repair tasks.

Training Situations

Forty-two training situations are identified in the decision guidance that is included in Appendix C of this report. A training situation is defined as a purpose for training or a result of training. Several generic training situations are used in combination to make up the 42 specific training situations in the decision guidance. They are:

1. System operation training results in the ability to operate the equipment represented at one crew position or Soldier-System Interface (SSI), without regard to other factors. This training enables crewmembers to "operate the system."
2. System utilization training results in the capability to employ the equipment represented at one crew position or SSI to accomplish required tasks in accordance with applicable doctrine and tactics, in expected tactical situations. This training enables crewmembers to "fight the system."

3. Systems utilization training results in the capability to employ collections of similar (functional area; e.g., Armor) or dissimilar (Combined Arms) systems to accomplish tactical objectives. This training is directed toward leaders and commanders at all organizational levels above the crew level.
4. Skill acquisition training results in the initial acquisition of system operation or utilization skills for a crew position or SSI. Skill acquisition training normally takes place in the institution and results in initial MOS qualification at Skill Level 1.
5. Skill sustainment training results in the maintenance of acquired system operation or utilization skills, or systems utilization skills, at a criterion level of performance. Skill sustainment training normally takes place in the unit.
6. Skill upgrade and progression training results in the improvement of system operation or utilization skills beyond initial criterion levels of performance, or the acquisition of additional skills required to attain higher formal Skill Levels. Skill upgrade and progression training normally takes place in the unit.
7. Positional cross-training results in the acquisition of skills required to operate and utilize the equipment at a crew position different from a crewmember's primary crew position. Positional cross-training normally takes place in the unit.
8. Transition training results in the acquisition of system operation skills required to operate or maintain new or replacement systems. Transition training normally is represented by New Equipment Training (NET), and conventionally takes place in the unit. In the case of AFV systems, transition training is expected to take place in an unconventional manner. The AFV transition training concept is to equip and field entire brigades receiving AFV systems at the same time, at one or more designated fielding sites, rather than in-unit at the home station.
9. Leadership and management training results in the acquisition of skills required to lead, manage, and command at all levels. Leadership and management training is conducted in both institutions (NCO and officer courses), and in units in conjunction with training for other purposes.

Levels of Training

Four distinct levels of training are considered in the decision guidance used in this analysis. They are:

1. Individual training that imparts equipment operation and system utilization skills to individual system crewmembers or maintainers.
2. Collective training that enables crews and teams to function effectively in employing a system to meet tactical objectives.
3. Functional area training that enables units equipped with like type systems (e.g., tank platoons, artillery batteries) to effectively operate to meet tactical objectives.
4. Force level training that enables combined arms and support forces to effectively conduct and support the battle.

APPENDIX C

NOTIONAL AFV GENERAL SOLDIER-SYSTEM INTERFACE SUITE PROFILES

Position: Driver

Application: All Vehicles

- Driving controls (directional, transmission, brake, accelerator)
- Vehicle subsystems status and monitoring displays (fuel gauge, caution and warning panel, engine instruments, etc.)
- Vehicle subsystems controls (engine, electrical, hydraulic, lights, etc.)
- External vision
 - Direct view/vision blocks/optical sight
 - Indirect view (TV, LLLTV, IR/thermal) - includes controls as necessary
- Intercom controls
- Tactical situation display (possible)
- Navigation system - if used by driver
 - Map Display
 - Inertial position/azimuth
 - Map/compass backup
- Maintenance/diagnostics displays and controls
 - BIT/BITE
- APU controls and displays
- Environmental controls and displays
- Smoke generator controls
- Embedded Training display(s)
- Refuel controls
- Mission-module relevant controls and displays (engineer and logistic vehicles)

Position: Assault Vehicle Commander

Application: Assault vehicles

- External vision
 - Direct view/vision blocks/optical sight
 - Indirect view (TV, LLLTV, IR/thermal) - includes controls as necessary
- External auditory
- Radios
 - Controls
 - Displays
 - Transmit/receive
- Sensor controls
 - TV/LLLTV/IR
- Vetronics control/display (general purpose interface)
- Embedded Training display(s)
- Fire control (secondary role if dedicated gunner crewmember present; self-defense weapon always)
 - Laser rangefinder controls (if present)
 - Sight with or without radar/sensor/cue/status overlays
 - Ammunition selection controls (including round type, charge, fuze, as applicable)
 - Weapon azimuth/elevation controls (and displays)
 - Firing control (trigger)
 - Weapon guidance controls (if applicable)
- Tactical situation display (possible)
- Navigation system
 - Map Display
 - Inertial position/azimuth
 - Map/compass backup
- Command and control displays/target handoff
- Environmental controls
- Maintenance/diagnostic controls/displays
- Intercom controls
- Resupply functional controls
- Uncooperative IFF controls/displays
- Mission module relevant controls/displays

Position: Support Vehicle Commander

Application: Non-assault Vehicles

- External vision
 - Direct view/vision blocks/optical sight
 - Indirect view (TV, LLLTV, IR/thermal) - includes controls as necessary
- Radios
 - Controls
 - Displays
 - Transmit/receive
- Sensor controls
 - TV/LLLTV/IR
- Vetronics control/display (general purpose interface)
- Embedded Training display(s)
- Fire control (self-defense weapon)
 - Sight
 - Ammunition selection controls (including round type, charge, fuze, as applicable)
 - Weapon azimuth/elevation controls (and displays)
 - Firing control (trigger)
- Tactical situation display (possible)
- Navigation system
 - Map Display
 - Inertial position/azimuth
 - Map/compass backup
- Command and control displays
- Environmental controls
- Maintenance/diagnostic controls/displays
- Intercom controls
- Resupply function controls (and perhaps rearm, if applicable)
- Mission module relevant controls and displays as applicable

Position: Direct Fire Weapons Gunner

Application: Variants with primary direct fire weapons (Tank, DEW, IFV, LOS-AT; LOS-AD; others as equipped with cannon self-defense weapon and/or ATGM)

- Fire control
 - Laser rangefinder controls
 - Laser designator (if present)
 - Radar controls and displays (if MMW radar or LADAR equipped)
 - Sight with or without radar/sensor/cue/status overlays
 - Ammunition selection controls (including round type, charge, fuze, as applicable)
 - Weapon azimuth/elevation controls (and displays)
 - Firing control (trigger)
 - Weapon guidance controls (if equipped with guided weapon)
- Intercom controls
- Tactical situation display (possible)
- Maintenance/diagnostic controls and displays (secondary role)
- Environmental controls
- Embedded Training display(s)
- Rearm function controls
- Uncooperative IFF controls and displays

Position: Indirect Fire Weapons Gunner

Application: Vehicles with primary indirect fire weapons (Howitzer, Rocket, Missile, NLOS-AD, NLOS-AT, Mortar, Smoke)

- Fire control
 - Weapon selection/assignment
 - Weapon status monitoring
 - Weapon mount/launcher control (azimuth, elevation)
 - Weapon launch control
 - Weapon sensor monitoring (weapons with man-in-loop; e.g. FOG-M)
 - Weapon guidance and control (man-in-loop only)
 - Command interface (launch orders)
 - Mission/fire mission planning displays/controls
- Intercom controls
- Maintenance/diagnostic controls and displays
- Environmental controls
- Embedded Training display(s)
- Rearm function controls and displays

Position: Sensor/communications/EW operator

Application: FIST, C2V, ETAS, IEW, Command Post

- External vision
 - Direct view/vision blocks/optical sight
 - Indirect view (TV, LLLTV, IR/thermal) - includes controls as necessary
- Radar/threat warning/EW sensor/EW/jammer controls and displays (as applicable)
- Radios
 - Controls
 - Displays
 - Transmit/receive
- Sensor controls
 - TV/LLLTV/IR/threat warning
- Vetronics control/display (general purpose interface)
- Target handoff controls/displays (some cases)
- Environmental controls
- Intercom controls
- Embedded Training display(s)
- Maintenance and diagnostics controls and displays
- Uncooperative IFF controls and displays (as applicable)

Position: Mission Equipment Operator

Application: Logistic, Engineer, Support Vehicles

- Mission equipment controls and displays (vary widely)
- Environmental controls
- Intercom controls
- External vision (many cases)
 - Direct view/vision blocks
 - Indirect view (TV, LLLTV, IR/thermal) - includes controls as necessary
- Embedded Training display(s)

Position: Battle Staff

Application: CMDGP, C2V

- Tactical situation display(s) and control(s)
- Radios
 - Controls
 - Displays
 - Transmit/receive
- Sensor controls
 - TV/LLLT/IR (possible)
- Target handoff controls and displays
- Environmental controls
- Intercom controls
- Navigation/position representation system
 - Map Display (possibly multiple)
 - Inertial position/azimuth
 - Map/compass backup
- External vision (possible)
 - Direct view/vision blocks/optical sight
 - Indirect view (TV, LLLTV, IR/thermal) - includes controls as necessary
- Embedded Training display(s)
- Removable workstations (replicate tactical situation/navigation controls/displays, target handoff, sensors [some cases], communications [some cases])

APPENDIX D

GUIDANCE FOR FORMULATING TRAINING SYSTEM CONCEPTS FOR DEVELOPMENTAL AND NOTIONAL SYSTEMS INCLUDING THE ROLES OF EMBEDDED TRAINING AND TRAINING DEVICES IN THE TRAINING SYSTEM CONCEPT

INTRODUCTION

The body of this Appendix is a listing of generic training situations which may have to be satisfied within a training system. In addition, there are indications of the preferred kinds of training support that might be adopted for hands-on training under each situation/condition. The site (unit or institutional) where each situation takes place (conventionally) is indicated parenthetically next to the description of the requirement. A capital letter (U, I) suggests the principal (or assumed sole) site where training takes place. A lower-case letter (u, i) suggests a secondary site. The implication is that training mainly takes place at the principal site and is supplemented by training at the secondary site.

The use of this listing is as follows. First, the functional performance requirements-set for a proposed system is derived, and whether or not training requirements exist within each functional performance requirement is decided (this also implies that it is decided whether each requirement involves human performance). To the extent possible, a "baseline comparison system" should be built for each alternative. Next, it is necessary to build in "deltas" to the functional level performance requirements from what is known about the Soldier-System Interface(s) (SSIs) and performance requirements. After this is done, decisions following are made at a task level.

Next, the decision guidelines in Implementing Embedded Training: Volume 2 of 10: ET as a System Alternative are applied to each functional performance requirement (or task) to make the decision to further consider ET (or not). The task-level decisions will then be aggregated for the overall decision for the system under consideration.

Next, map the functional performance requirements (or tasks; requiring training) across the collection of training situations listed below. Each requirement (task) should be identified as likely to be present (require training) or absent (not) in each condition. Then, the collection of functional requirements (tasks) to be trained (in some fashion) in each training situation is examined, and the potential for ET and training devices (by kind) over the collection of requirements is assessed according to the guidance provided. This process should be conditioned by what is known about Embedded Training implementation feasibility, as well as historical practice and results in device and Embedded Training utilization. All assumptions and caveats used in this process must be made completely explicit, in order that all decisions may be re-created, or at least audited. The training system concept will be an aggregate of the decisions made in each of the training-situation areas.

The "outline" provided by the various training situations represents a candidate organizational device for presenting the training system concept, both from a functional/task training requirements perspective and a "support concepts" approach (e.g., ET and TDs, TEC, TMS, etc.). That is, all of the training situations (that apply), taken together, along with the training support concepts for each, form the training system concept. And, the implications for ET and TDs, in the aggregate, specifies (at the level of detail available) the role of ET in the total training system--as well as the notional TD requirements.

NOTE: In the material following, the term "system utilization" refers to "how to fight" the system or a collection of like-type or combined-arms systems--from the individual level through crew through combined arms employment. Also, in each case where alternatives are discussed, it is assumed that use of the actual system in non-device based training (e.g., any sort of exercise, drill, live fire practice, maintenance training, etc.) is an alternative to either ET or TD usage. The discussion below is confined to ET and TD utilization, however.

TRAINING SITUATIONS AND CANDIDATE ET/TD DECISION GUIDANCE

INDIVIDUAL TRAINING

System Operation and Utilization

1. Individual common MOS skills acquisition (common MOS skills) (I)
 - . Potential ET TD usage: minimal. Actual equipment or mock-ups may be useful for familiarization in many cases. Many tasks and functions are non-system-specific.
2. Individual system operation skills acquisition (I, u)
 - . Potential ET-TD usage: alternatives include familiarization training devices (e.g., mockups, low operational fidelity); positional trainers with mixed fidelity (e.g., driver trainers, gunnery trainers and simulators, etc.). ET is an alternative when the decision is made to afford the cost of actual systems for institutional skills acquisition training, based on other factors.
3. Individual system utilization (how to fight the system) skills acquisition (I, U)
 - . Potential ET-TD usage: difficult to determine. Some devices applicable to situation #2 above (e.g., driver trainers, positional trainers, precision gunnery trainers such as TWGSS) are appropriate here, in cases where crew coordination is not required (separate situation, below). ET is an alternative in cases where it is already provided for other acquisition training purposes.
4. Individual system operation skills sustainment (U)
 - . Potential ET-TD utilization: ET is a preferred alternative here. Some utilization may be made of the same types of positional trainers used in #2 and #3 above, if cost-effective, or if there is no ET, or if ET is deemed not to have the capabilities to support the required training. Training the types of skills in question here requires frequent access to operational equipment, if no ET or TD capability is present in the unit.

5. Individual system utilization skills sustainment (U)

- . Potential ET-TD utilization: ET is a preferred alternative in this case, particularly in single-crewed notional systems. Positional trainer use is a possibility, as in #3 above, as is single-person use of such devices as U-COFT (if that makes any sense for the system in question) -- if such are available.

6. Individual skill upgrade and progression - system operation (U)

- . Potential ET-TD utilization: again, ET is a preferred alternative. Other alternatives include actual equipment used in other than ET modes (but exercises or system on-time may be more costly), and the same types of stand-alone training devices mentioned in #2 and #3, if available, as well as instructor-based OJT. In some cases, training in this situation may be equivalent to positional cross-training (see #8 and #9 below), as in the skill upgrade path for tank crews (SL 1/loader to SL 2/gunner to SL 3/tank commander). In such cases, the guidance here and for #8 should be used together.

7. Individual skill upgrade and progression - system utilization (U)

- . Potential ET-TD utilization: ET is probably a preferred alternative, with the same alternatives as mentioned in #6 above. However, this situation may include advanced system-employment tactics training, which could require simulation of other similar or dissimilar systems, or OPFOR, or both, calling for a more capable (e.g., relatively comprehensive simulation of the external environment) ET component or TD.

8. Individual positional cross-training within crew/team - system operation (U)

- . Potential ET-TD utilization: ET is a preferred alternative both for knowledge training (in a CAI-like mode) and for hands-on training. However, ET for acquisition training (which this will be) may require more elaborate courseware and the ability to sense, interpret, and measure performance on a wider variety of trainee actions than sustainment. Alternatives to ET include positional trainers, COFTs (if available and if they support skill acquisition), and use of actual equipment in conventional training modes.

9. Individual positional cross-training within crew/team - system utilization (U)
 - . Potential ET-TD utilization: as for #8 above. Situational and scenario simulation requirements may be high, due to the probable need for system tactical utilization training.
10. Individual positional transition training (NET or cross-over) - system operation (U) NOTE: This situation explicitly includes Instructor and Key Personnel Training (IKPT) and New Equipment Training (NET), as does #11 below.
 - . Potential ET-TD utilization: ET is strongly preferred alternative for hands-on training. ET may also be utilized for knowledge training in this situation, but if such use is proposed, it adds a requirement for an embedded CAI capability. Emphasis here will be on "working the new system," so external environment simulation needs will be moderate to low. Also see the discussion above under #8 regarding courseware requirements. Other alternatives include training on the actual equipment in conventional modes, as well as utilization of any positional trainers that may be available or projected.
11. Individual positional transition training (NET or cross-over) - system utilization (U)
 - . Potential ET-TD utilization: ET is again a strongly preferred alternative, with approximately the same additional alternatives as in #10 above. However, since this involves "how-to-fight-the-system" training, external environment simulation (e.g., other systems, OPFOR) may be a major requirement in this situation.
12. Individual leadership and management training (crew/team leader level) (I)
 - . Potential ET-TD utilization: both devices and ET may play some role in training in this situation (normally for NCO's PNCOC, BNCOC, ANCO and for officers Basic and Advanced Officer Training for the involved branch). In terms of crew/unit leadership and management, however, there are expected to be few hands-on training requirements.

System Maintenance - Crew

13. Individual crewmember maintenance knowledge acquisition (system anatomy and geometry, theory of operation) (I)

- . Potential ET-TD utilization: little if any role for ET. TDs for this training situation may include mockups (alternatively, actual equipment), and maintenance trainers used for demonstration and familiarization purposes only.

14. Individual crewmember maintenance fault isolation and troubleshooting skills acquisition (I, u)

- . Potential ET-TD utilization: if BIT/BITE is present in a system and routinely used by crewmembers to troubleshoot the system, ET may be a preferred alternative in this situation, especially if training occurs in the unit. ET in this case takes the manifestation of a "symptom simulator," supporting troubleshooting skills acquisition. ET may also provide some maintenance job aiding (information presentation and possibly decision support). If BIT/BITE is lacking, or not routinely used by the crew, the role of ET is negligible. Alternatives are CAI-based troubleshooting training (generic or system-specific), and conventional laboratory-based or OJT maintenance training using either maintenance trainers or actual equipment and general-purpose or system-specific test equipment.

15. Individual crewmember maintenance service and repair skills acquisition (i, U)

- . Potential ET-TD utilization: a very modest role is perceived for ET in this situation. This role consists of potential presentation of job aiding information to a crewmember maintainer (if feasible), and possibly some parameter sensing and feedback to crewmember maintainers. ET could be a feasible alternative to separate aiding devices such as MEIDS. Other alternatives include mockup or instrumented maintenance trainers, and actual equipment training (but actual equipment must be faulted or out-of-tolerance if repair procedures are to be done).

16. Individual crewmember maintenance fault isolation and troubleshooting skills sustainment (U)

- . Potential ET-TD utilization: see #14 above.

17. Individual crewmember maintenance service and repair skills sustainment (U)

. Potential ET-TD utilization: see #15 above.

18. Individual crewmember maintenance skills upgrade (U)

. Potential ET-TD utilization: see #14 above.

System Maintenance - Dedicated-Job Maintainers

19. Individual common maintenance MOS skills acquisition (I, u)

. Potential ET-TD utilization: minimal. Actual equipment or mock-ups are useful for familiarization. Many (perhaps all) tasks and functions may be non-system-specific.

20. Individual maintainer maintenance knowledge acquisition (system anatomy and geometry, theory of operation) (I)

. Potential ET-TD utilization: little if any role for ET. TDs for this training situation may include mockups (alternatively, actual equipment), and maintenance trainers used for demonstration and familiarization purposes.

21. Individual maintainer maintenance fault isolation and troubleshooting skills acquisition (I, u)

. Potential ET-TD utilization: ET may play a significant role as a "symptom simulator," allowing the maintainer to practice fault isolation techniques and gain additional knowledge about how and why systems fail. However, this is more likely to be the case in the unit context. Actual equipment with these ET capabilities will probably be judged too costly to procure for institutional maintenance training. However, there exists the potential for commonality of training courseware and software between institutional trainers and ET used for maintenance. Maintenance trainers are a highly preferred alternative for the institutional setting, due to their relatively low cost. For this training situation, there may need to be extensive "symptom simulation" capability.

22. Individual maintainer maintenance service and repair skills acquisition (I, U)

- . Potential ET-TD utilization: ET is not a preferred candidate here, since ET requires the actual system, and would also require the insertion of faults or placing equipment in an out-of-tolerance condition. This will probably have unacceptable readiness impacts (both system downtime and maintenance-induced reliability problems). Preferred alternatives include full- or sub-scale mockup-type maintenance trainers for subsystems of the actual equipment with the capability for trainees to practice a wide variety of maintenance tasks.

23. Individual maintainer maintenance fault isolation and troubleshooting skills sustainment (U)

- . Potential ET-TD utilization: see the discussion in #14 above. The potential exists for very high levels of skill development via ET in the unit setting, since ET can be used to drill the maintainer in troubleshooting practice, as well as to present rarely encountered or subtle problems to the unit maintainer.

24. Individual maintainer maintenance service and repair skills sustainment (U)

- . Potential ET-TD utilization: see the discussion in #15 above.

25. Individual maintainer maintenance skills upgrade (U)

- . Potential ET-TD utilization: see the discussion in #14 above, as well as the comment in #23 above.

26. Individual maintainer transition training (NET or cross-training) (U)

- . Potential ET-TD utilization: see the discussions in #21 and #22 above.

27. Maintainer leadership and management training (U)

- . Potential ET-TD utilization: see the discussion in #12 above.

COLLECTIVE TRAINING (CREW/TEAM LEVEL)

System Operation and Utilization

28. Common MOS collective skills acquisition (I)
 - . Potential ET-TD utilization: minor or perhaps nonexistent role for either ET or TDs in this area (tasks and functions are anticipated to be non-system-oriented).
29. Crew/team collective system operation skills acquisition (I, U)
 - . Potential ET-TD utilization: ET is a preferred alternative in the unit environment, both in direct-stimulation and "cascade" training modes (where stimulation of some subset of the crewmembers for training provides performance and practice opportunities for other crewmembers). Unit environment alternatives include U-COFT and other team/crew training devices such as aviation crew trainers, etc., if available. In the institutional environment, TDs are probably the preferred alternative due to cost of providing actual equipment (this excludes aviation and other domains where full proficiency must be trained for safety or other reasons). Institutional preferred alternatives are part-task or full-task TDs exemplified by I-COFTs, precision gunnery trainers, GUARDFIST, and other types of team/crew procedures trainers. For gunnery tasks, subcaliber devices are also alternatives both in the unit and the institution. The institutional alternatives are secondary alternatives for unit training; their utilization depends upon the relative cost-effectiveness of providing stand-alone devices versus ET (tradeoffs are expected but not guaranteed to favor ET).
30. Crew/team collective system utilization skills acquisition (I, U)
 - . Potential ET-TD utilization: see discussion under #29 above.
31. Crew/team collective system operation skills sustainment (U)
 - . Potential ET-TD utilization: ET is clearly a preferred alternative for a majority of types of systems, for both direct-stimulation

exercises and scenarios, and "cascade" crew training. An exception is aviation, where ET utilization may induce safety problems if flight crew members are trained during actual flight (however, ground-based training using ET and ET for training mission crewmembers during flight may be a cost-effective alternative). Other alternatives include all types of part-task and full-task TDs which are available or provided at the unit level.

32. Crew/team collective system utilization skills sustainment (U)

- . Potential ET-TD utilization: see discussion under #31 above.

33. Crew/team collective system operation skills upgrade (U)

- . Potential ET-TD utilization: ET is a preferred alternative. Other alternatives include all types of part-task and full-task training devices which may be available or provided at the unit level (e.g., U-COFT, GUARDFIST-type devices, Weapon System Trainers [aviation], etc.), as well as drills using the actual equipment (ET may be used in a performance measurement mode in this case), range firing with full-scale or subcaliber devices (for gunnery training), conventional (e.g., non-stimulated) crew drills and exercises, etc.

34. Crew/team collective system utilization skills upgrade (U)

- . Potential ET-TD utilization: see discussion under #33 above.

35. Collective cross-training within crew/team - system operation (U)

- . Potential ET-TD utilization: see discussion under #31 above.

36. Collective cross-training within crew/team - system utilization (U)

- . Potential ET-TD utilization: see discussion under #31 above.

37. Collective transition training (NET or cross-over) - system operation (U)

- . Potential ET-TD utilization: see discussion under #31 above.

38. Collective transition training (NET or cross-over) - system utilization (U)

- . Potential ET-TD utilization: see discussion under #31 above.

FUNCTIONAL AREA TRAINING

39. Unit-level collective system utilization acquisition (fighting the systems in concert - to the highest level involving homogeneous or all-like-type systems within a unit) (i, U)

- . Potential ET-TD utilization: in the institutional environment, off-line gaming and exercises not requiring actual systems (such as TEWTs) are preferred alternatives due to the cost of providing actual equipment for institutional-based training, as are SIMNET-based exercises and other interactive gaming approaches. In the unit environment, "netted" ET - either by inherent features or via such means as SIMNET - is a preferred alternative. However, exercises (FTX, CPX, TEWT, STX. etc.) add greatly to training value when well planned and when performance evaluation is good, and should be considered as strong alternatives, as well. MILES is a valuable resource in such training, especially if comprehensive after-action reviews are conducted. A judicious mix of "netted" ET and exercise training is probably an attainable goal. Other alternatives include unit-level command and control simulations (off-system), where adequate performance evaluation and feedback can be provided, and large-scale exercises at regional training centers and the NTCs.

40. Unit-level collective system utilization sustainment (U)

- . Potential ET-TD utilization: see discussion under #39 above.

FORCE-LEVEL TRAINING

41. Combined arms (command and control) systems utilization (battle management) skill acquisition (combined arms command and battle staff) (i, U)

- . Potential ET-TD utilization: ET probably has no direct role in this training. However, provision should be made to provide status information (e.g., position/location, communications, etc) from ongoing

training (when available) based on "netted" ET or other training activities (e.g., exercises) to command and battle staffs (possible via SIMNET) in order to support staff-level training. Available alternatives are the family of command group training simulations (e.g., JESS, ARTBASS, First Battle, etc., and future developments e.g. CORSIM) developed by CAC, in a mix with conventional command group training exercises (FTX, CPX, TEWT, etc.). The possibility may exist at some future time for command-group simulation results (e.g., orders) to act as inputs for units training under netted ET or SIMNET, and the actions, reactions and activities of the units to be fed back as inputs to the command-group training. Larger-scale exercises, such as those conducted at the NTCs and regional training centers; and major evolutions such as REFORGER and other periodic and preplanned evolutions are also alternatives.

42. Combined arms (command and control) systems utilization skill sustainment (U)
 - . Potential ET-TD utilization: see discussion under #41 above.

APPENDIX E

PERFORMANCE REQUIREMENTS TAXONOMY

The performance requirements taxonomy used in the AFV training system concepts analysis is presented in this Appendix. The taxonomy is derived from Kaplan and Crooks (1980).

BATTLEFIELD RECONNAISSANCE

1. Identify key environmental features.
2. Identify current weather conditions.
3. Identify key elements of threat force.
4. Identify essential information evaluating NBC contamination hazard outer limits.
5. Identify/select routes.
6. Present information about routes which could influence movement.
7. Identify hazards to movement.
8. Identify early warning of enemy threat.
9. Report map changes.

CONTROL OF FRIENDLY FORCES ON THE BATTLEFIELD

1. Determine commander's desired outcome and priorities.
2. Determine the tactics to be followed.
3. Select the most appropriate friendly unit(s) to engage in operation. (The following types of units should be considered: first echelon, reserve, intelligence, counter-intelligence, maintenance, logistics.)
4. Determine travel routes for friendly units.
5. Determine departure and projected arrival times for friendly units.
6. Prepare contingency plans and the situations in which each is to be implemented.
7. Prepare plans, orders, maps and other required documents.
8. Prepare materials for briefing commanders and staffs.
9. Monitor units' compliance with orders and their progress.
10. Identify critical situations which indicate significant changes in battlefield operations.
11. Update plans/orders as battlefield situation changes.

ENGINEERING-BRIDGING

1. Prepare bridge site.
2. Excavate foundations.
3. Construct bridge abutments.
4. Construct bridge span.
5. Construct/assemble bridge.
6. Prepare bridge for launching.
7. Position bridge transporter for launching.
8. Launch/drive bridge into water.
9. Connect bridge.
10. Recover bridge.
11. Disassemble bridge.

ENGINEERING--OBSTACLE REMOVAL/BREACHMENT

1. Acquire obstacle to be dealt with.
2. Prepare system hardware for obstacle removal/breaching. The nature of this preparation is entirely dependent upon the sort of system under consideration. It may involve preparation for bulldozing, gun firing, demolition, etc.
3. Decide on placement of fire, charge, or pressure in relation to obstacle.
4. Remove/breach obstacle.
5. Remove/displace remains of obstacle.

ESCAPE FROM SYSTEM

1. Destroy or alter critical components of communication and other sensitive equipment/documents.
2. Take personal weapon, ammunition, and survival equipment.
3. Position system for escape, if possible under the conditions imposed.

4. Open escape path out of system.
5. Escape from system.

ESTABLISHMENT AND MAINTENANCE OF COMMUNICATIONS

1. Assemble communications device(s).
2. Assemble/erect/orient antenna.
3. Establish communications net.
4. Enter communications net.
5. Transmit messages.
6. Receive messages.

INFORMATION ROUTING

1. Identify appropriate recipients of information.
2. Prioritize recipients for the delivery of information.
3. Prioritize pieces of information for delivery.
4. Assign security classification and method for maintaining that classification.
5. Determine call signals/frequencies.

LOGISTICS

1. Maintain information on current status of supplies.
2. Maintain information on maintenance status of equipment needed for mission.
3. Recommend location of rear boundary bases.
4. Recommend main and secondary supply routes.
5. Determine throughput unit supply requirements.
6. Recommend movements which are consistent with logistics considerations.
7. Develop policies for area damage control operations.

NAVIGATION

1. Select appropriate maps and/or navigation aids.
2. Identify present location.
3. Identify destination.
4. Select travel route.
5. Estimate time of arrival and fuel requirements.
6. Travel designated route.
7. Identify position or route at specified times/locations.

PREVENTION OF DETECTION/LOCATION OF SYSTEM

1. Detect threat warning(s) which indicate either search or attack modes.
2. Identify the nature of the threat(s) from which detected threat warnings emanate.
3. Take appropriate countermeasures to reduce the probability of identification of location. (These countermeasures include: jamming, smoke, flares, chaff, powered decoys, signature alteration, and electronic attack of threat-sensing equipment.)
4. Camouflage system. (System camouflage includes: physical, infrared, and radar signature reduction.)

PREVENTION OF INTERCEPTION/JAMMING

1. Encode messages.
2. Authenticate transmissions.
3. Decode messages.
4. Apply anti-jamming procedures.
5. Apply transmission security procedures.

PROJECTION OF BATTLEFIELD OPERATIONS

1. Determine observable indicators of possible changes in the operational situation.
2. Prioritize indicators of operational changes.

3. Assign intelligence collection tasks to maximize receipt of indicators according to their priorities.
4. Monitor intelligence collection and reassign tasks based on updated information.
5. Display pertinent information.
6. Identify important missing information.
7. Identify important information which is internally inconsistent or probably inaccurate.
8. Develop alternate sources of information.
9. Determine which model(s) of expected enemy behavior best fits collected information.
10. Assign confidence levels to the projection(s).
11. Make recommendations about the effects of projected operations.
12. Prioritize information according to user(s) need and probability of accuracy.
13. Prioritize list of information users for receipt of information based on their functions in this specific operation and their requirements.

RECONNAISSANCE/FIRE CONTROL

1. Determine target type/number/size/direction/speed/elevation.
2. Determine weather conditions affecting weapons delivery.
3. Determine target coordinates.
4. Mark target locations; this may be done by physical, chemical, radiological or electronic means.
5. Handoff target(s) to attack units.
6. Determine effects of fire on target.
7. Relocate target(s).
8. Adjust fire of attacking unit(s).

REPRESENTATION OF FORCES' STATUS

1. Indicate location(s) of forces.
2. Indicate composition (number and type) of forces.
3. Indicate availability of forces.
4. Indicate peculiarities/weaknesses of forces.
5. Indicate recent significant tactical events in which specific units were involved.
6. Indicate actions which forces are currently pursuing. (Your consideration of these actions should include: direction of movement, speed of movement, and apparent purpose(s) of movement.)
7. Indicate the enemy commander's previous behavior in similar situations.
8. Indicate combat effectiveness of forces.
9. Indicate relative combat power of enemy to friendly units.
10. Indicate relevant threat potentials of enemy forces.
11. Identify important missing information.
12. Identify important information which is internally inconsistent or probably inaccurate.
13. Develop alternate sources of information.
14. Prioritize information according to the users' needs and probability of its accuracy.
15. Prioritize list of information users for receipt of information based on their functions in this specific operation and their requirements.

REPRESENTATION OF TERRAIN/OBSTACLES/INSTALLATIONS/WEATHER

1. Indicate key terrain features which might affect outcome of the operation. (Your consideration of terrain features should include the following: coastline configuration, exits from beaches, avenues of approach, cover and concealment, observation and fields of fire, defiladed areas, areas suitable for aviation landing, positions for weapons, spaces for maneuver, points of maximum disruption, soil composition, water depth, terrain slopes, beach characteristics, elevations, and accessibility of terrain features.)

2. Indicate man-made obstacles which might affect the outcome of the operation. (Your consideration of man-made obstacles should include: minefields, tank traps, water obstacles, ditches, and destroyed/potentially destroyed bridges, tunnels, etc.)
3. Indicate installations which might affect the outcome of the operation. (Your consideration of installations should include the following: airports, heliports, enemy depots, enemy command posts, enemy transportation facilities, enemy communication facilities, enemy power operation facilities/lines, enemy C³ positions, enemy air defense systems, enemy radar facilities, and enemy satellite microwave receiver stations.)
4. Indicate features of weather which might affect the outcome of the operation. (Your consideration of weather should include the following: visibility data, wind data, temperature data, humidity data, and precipitation data.)
5. Identify important information which is missing.
6. Identify important information which is internally inconsistent or probably inaccurate.
7. Develop alternate information sources.
8. Prioritize information according to users' need and probability of its accuracy.
9. Prioritize list of information users for receipt of information based on their functions in this specific operation and their requirements.

SELECT THE MOST APPROPRIATE FRIENDLY UNIT(S) TO ENGAGE IN OPERATION

1. Determine the requirements the operation will make on the friendly unit.
2. Order these requirements based on commander's priorities.
3. Identify friendly unit(s) with the appropriate mix of attributes to match the prioritized requirements.
4. Determine which friendly units, with the correct attributes, can be removed from their present operation without unacceptable consequences.
5. Determine the transportation systems required to move each friendly unit to the operational area.
6. Determine the availability of each transportation system required to move each friendly unit and the time required for it to perform its function.

7. Determine the logistics required by each friendly unit to perform its functions in the operation in question.
8. Determine the availability of the supplies and delivery systems to the operations area for the required logistics of each friendly unit.
9. Display all significant information and order it in some logical and helpful manner.

SELECTION AND ORDERING OF APPROPRIATE TARGETS

1. Locate potential targets.
2. Identify type and number of potential targets.
3. Determine threat potentials of targets.
4. Determine availability of appropriate friendly weapon system.
5. Determine the probability of eliminating target(s).
6. Prioritize targets.
7. Select targets to attack.

SELF-RECOVERY

1. Prepare system for self-recovery.
2. Reconnoiter for appropriate anchor points and recovery path.
3. Position anchors.
4. Attach cables to anchors/winches.
5. Pull system to safe area.
6. Disassemble/stow self-recovery components.

SYSTEM PROTECTION FROM THREAT

1. Identify threat to system (e.g., onboard fire, flooding, imminent crash, NBC, enemy attack.)
2. Activate hardware protective device(s).
3. Put on protective gear/clothing.
4. Secure material/cargo for protection against threat.

5. Assume protective position for crew/passengers.
6. Maneuver to protect from threat.
7. Deactivate hardware protective device(s).

TARGET ACQUISITION

1. Detect target(s)
2. Identify target(s).
3. Select target(s) and target order.
4. Orient weapon system in general firing position.
5. Determine range of target.
6. Aim weapon system. This involves a procedure which results in the system being adjusted for the azimuth and elevation of the target.
7. Illuminate or designate target.
8. Adjust aim, following miss.
9. Shift to second target.

TARGET BEHAVIOR PREDICTION

1. Predict maneuver of target(s).
2. Predict location of target(s) after given time interval, or predict time interval to arrive at given location (location includes range, altitude, azimuth, elevation, etc.).
3. Predict attack of target(s) on friendly forces.
4. Predict time/location for successful attack on target(s).

TARGET DESIGNATION

1. Assemble/disassemble system.
2. Calibrate/align system.
3. Select designator system position.
4. Acquire target.

TARGET INFORMATION GATHERING AND INTERPRETATION

1. Assemble system.
2. Position system in appropriate location.
3. Select type and number of sensors.
4. Position sensors in appropriate location.
5. Calibrate/align system components.
6. Detect target(s).
7. Identify target.
8. Determine number of targets.
9. Determine target location/range.
10. Determine target speed.
11. Determine target direction.
12. Determine target formation/tactical situation.
13. Select and order targets based on the matching of priorities with target information gathered.
14. Recognize countermeasures and take appropriate action.

VEHICLE MANEUVERING--GROUND VEHICLES

1. Observe environment for obstacles, landmarks, etc.
2. Read and use instruments appropriate to vehicle maneuvering.
3. Perform the following, moving backward (b) and/or forward (F). Circle B or F as appropriate.
 - 3.1 Tight turn. B F
 - 3.2 Wide turn. B F
 - 3.3 Accelerating turn. B F
 - 3.4 Decelerating turn. B F
 - 3.5 Rapid acceleration. B F
 - 3.6 Gradual acceleration. B F

- | | | | |
|------|-------------------------------|---|---|
| 3.7 | Rapid deceleration (no stop). | B | F |
| 3.8 | Gradual deceleration. | B | F |
| 3.9 | Sudden stop. | B | F |
| 3.10 | Maintain constant speed. | B | F |

VEHICLE LOADING/UNLOADING

1. Load and position cargo/passengers in/on vehicle.
2. Secure cargo/passengers.
3. Unload vehicle.
4. Fuel vehicle.
5. Load ammunition.

VEHICLE RECOVERY

1. Position recovery vehicle.
2. Prepare recovery vehicle.
3. Prepare system to be recovered.
4. Attach cables between system to be recovered and recovery vehicle.
5. Reconnoiter recovery area.
6. Tow/lift/push system to be recovered.
7. Disassemble/stow recovery equipment.

WEAPON DELIVERY - GENERAL

1. Assemble system.
2. Emplace system.
3. Calibrate system components including boresighting and zeroing.
4. Acquire target(s).
5. Select ammunition.
6. Prepare ammunition for firing.

7. Communicate fire order and other intra-crew instructions.
8. Fire weapon.
9. Dispose of spent casing(s).
10. Guide projectile to target.
11. Perform misfire procedure.
12. Perform hangfire procedure.
13. Clear/swab/clean appropriate sections of systems.
14. Disassemble system.

WEAPON DELIVERY--GROUND TO GROUND MISSILES

1. Mate warhead to missile.
2. Load and secure missile on launcher.
3. Convert transport to launcher.
4. Position and emplace launcher.
5. Lay system for azimuth and elevation.
6. Install sighting components.
7. Calibrate system including boresighting and collimating.
8. Conduct missile system prefire checkouts.
9. Inspect system for defects.
10. Arm system.
11. Identify/determine target.
12. Identify/determine target coordinates.
13. Program missile.
14. Initiate firing sequence.
15. Fire system.
16. Guide missile to target.
17. Handoff missile to intermediate guidance.

18. Perform missile no-go procedure.
19. Perform misfire procedure.
20. Perform hangfire procedure.

WEAPONS DELIVERY--MINES

1. Select appropriate location for mine installation.
2. Inspect mine/triggering device/fusing device.
3. Transport mine.
4. Prepare mine for installation.
5. Install mine (including the digging of a hole).
6. Camouflage mine/triggering device.
7. Aim mine, if applicable.
8. Test circuit(s).
9. Arm mine.
10. Fire mine, if applicable.
11. Disarm mine.

WEAPON FUNCTION MANAGEMENT

1. Determine type of target.
2. Determine speed/direction of target.
3. Determine target range at time of weapon delivery.
4. Determine weather conditions which impact weapon delivery and adjust for them.
5. Determine type of ammunition to be used based on all above factors.
6. Determine probable amount of ammunition required to kill target under existing/projected conditions.
7. Recommend action based on available supply of ammunition, future probable requirements for ammunition, and probable required amount to kill target at various ranges/speeds.

PREFACE TO APPENDIXES F THROUGH J

Appendixes F through J contain the training requirements analysis support data for each of the five selected AFV exemplar mission modules. These are presented as one-page listings for each of the 42 training situations in the decision guidance of Appendix D, in the same order as the training situations are listed in Appendix D.

Within each listing, the training requirements areas identified as requiring training in the situation under consideration are listed. A reference number for the training requirements area and the title of the training requirements area appear as the first two columns of the listing. These are followed by 15 columns of decision information about the training requirements areas, in four groups. The first three groups contain only yes-no decision judgments; therefore, only the values "y" and "n" appear in these columns. The fourth group contains ratings on a high-moderate-low scale. Thus "h," "m," and "l" values appear in these columns.

The first group identifies crew positions which are expected to be involved in performing the tasks concerned with the training requirements area. There are six columns here, one for each of six generic crew positions. The two types of vehicle commanders and the two types of gunners listed in the body of the text are not distinguished here, nor are sensor and mission equipment operators distinguished. The column headings correspond, as follows:

- DRIV - driver
- CMDR - vehicle commander
- GUNR - gunner
- OPRS - sensor or mission equipment operators
- STAF - commanders and battle staff
- MAIN - maintainers

The second group contains two columns. These columns indicate whether training (TRNG column heading) and sustainment (SUST) are required for each training requirements area. In all cases in these listings, training is required (since requirements would not appear in a listing otherwise).

The third group contains four columns. These identify whether individual (INDV), crew/team collective (COLL), functional area (branch; FORC), or combined arms (CA) training is associated with each training requirement.

The final group contains three columns. These are ratings, on a high moderate low scale, of the criticality (CRIT), perishability (PERI), and performance difficulty (DIFF) of tasks in each training requirements area. Ratings of moderate or higher on either criticality or perishability scales indicate that tasks in a training requirements area are candidates for inclusion in Embedded Training.

APPENDIX F

TRAINING REQUIREMENTS ANALYSIS DATA FOR FUTURE ARMORED COMBAT SYSTEM (FACS)

Individual Common MOS Skill Acquisition

Task Area	Performance Requirements Class	D R I V	C M D R	G U N R	O P T I C	S I G N A L	M A I N T E N A N C E	T R A I N I N G	S U P P O R T	I N F O R M A T I O N	C O M M U N I C A T I O N	F I E L D	C O M P U T E R	P E R S O N A L	D I F F I C U L T
6 Establish/Maintain Communications		n	y	n			n	y	y	y	n	n	n		h m l
9 Navigation		y	y	n			n	y	y	y	n	n	n		h m h
10 Prevention of Detection/Location		y	y	y			n	y	y	y	y	n	y		h m m

Individual System Ops. Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F	
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F	
1	Battlefield Reconnaissance	n	y	y			n	y	y	y	y	n	n		h	m	h
5	Escape From System	y	y	y			n	y	y	y	n	n	n		h	l	l
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n		h	m	l
9	Navigation	y	y	n			n	y	y	y	n	n	n		h	m	h
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	y		h	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n		h	m	m
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	y	n	n		h	h	h
18	Self recovery	y	y	y			n	y	y	y	y	n	n		h	m	m
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n		h	h	h
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n		h	h	h
24	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n		h	m	l

Individual System Util. Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
1 Battlefield Reconnaissance		n	y	y			n	y	y	y	y	n	n	h	m	h
9 Navigation		y	y	n			n	y	y	y	n	n	n	h	m	h
10 Prevention of Detection/Location		y	y	y			n	y	y	y	y	n	y	h	m	m
17 Select and Order Appropriate Targets		n	y	y			n	y	y	y	y	n	n	h	h	h
19 System Protection From Threat		y	y	y			n	y	y	y	y	n	n	h	h	h
20 Target Acquisition		n	y	y			n	y	y	y	y	n	n	h	h	h
21 Target Behavior Prediction		n	y	y			n	y	y	y	y	n	n	h	h	h
25 Vehicle Manuevering		y	n	n			n	y	y	y	n	n	n	h	m	m
27 Weapon Delivery (General)		n	y	y			n	y	y	y	y	n	n	h	h	h
30 Weapon Function Management		n	n	y			n	y	y	y	n	n	n	h	h	m

Individual System Ops. Skill Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
1 Battlefield Reconnaissance		n	y	y			n	y	y	y	y	n	n	h	m	h
5 Escape From System		y	y	y			n	y	y	y	n	n	n	h	l	l
6 Establish/Maintain Communications		n	y	n			n	y	y	y	n	n	n	h	m	l
9 Navigation		y	y	n			n	y	y	y	n	n	n	h	m	h
10 Prevention of Detection/Location		y	y	y			n	y	y	y	y	n	y	h	m	m
11 Prevention of Interception/Jamming		n	y	n			n	y	y	y	n	n	n	h	m	m
17 Select and Order Appropriate Targets		n	y	y			n	y	y	y	y	n	n	h	h	h
18 Self recovery		y	y	y			n	y	y	y	y	n	n	h	m	m
19 System Protection From Threat		y	y	y			n	y	y	y	y	n	n	h	h	h
20 Target Acquisition		n	y	y			n	y	y	y	y	n	n	h	h	h
24 Vehicle Loading/Unloading		y	y	y			n	y	y	y	y	n	n	h	m	l
25 Vehicle Maneuvering		y	n	n			n	y	y	y	n	n	n	h	m	m
27 Weapon Delivery (General)		n	y	y			n	y	y	y	y	n	n	h	h	h
30 Weapon Function Management		n	n	y			n	y	y	y	n	n	n	h	h	m

Individual System Util. Skill Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A		R	E	I
		I	D	N	R	A	I	N	S	D	L	R			I	R	F
		V	R	R	S	F	N	G	T	V	L	C			T	I	F
1	Battlefield Reconnaissance	n	y	y			n	y	y	y	y	n	n		h	m	h
9	Navigation	y	y	n			n	y	y	y	n	n	n		h	m	h
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	y		h	m	m
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	y	n	n		h	h	h
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n		h	h	h
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n		h	h	h
21	Target Behavior Prediction	n	y	y			n	y	y	y	y	n	n		h	h	h
25	Vehicle Manuevering	y	n	n			n	y	y	y	n	n	n		h	m	m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n		h	h	h
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n		h	h	m

Individual System Ops. Skill Upgrade

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
5	Escape From System	y	y	y			n	y	y	y	n	n	n	h	l	l
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n	h	m	l
9	Navigation	y	y	n			n	y	y	y	n	n	n	h	m	h
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	y	h	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n	h	m	m
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	y	n	n	h	h	h
18	Self recovery	y	y	y			n	y	y	y	y	n	n	h	m	m
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n	h	h	h
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n	h	h	h
24	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n	h	m	l
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n	h	h	h
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n	h	h	m

Individual System Util. Skill Upgrade

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	
1 Battlefield Reconnaissance		n	y	y			n	y	y	y	y	n	n	h	m	h
9 Navigation		y	y	n			n	y	y	y	n	n	n	h	m	h
10 Prevention of Detection/Location		y	y	y			n	y	y	y	y	n	y	h	m	m
17 Select and Order Appropriate Targets		n	y	y			n	y	y	y	y	n	n	h	h	h
19 System Protection From Threat		y	y	y			n	y	y	y	y	n	n	h	h	h
20 Target Acquisition		n	y	y			n	y	y	y	y	n	n	h	h	h
21 Target Behavior Prediction		n	y	y			n	y	y	y	y	n	n	h	h	h
27 Weapon Delivery (General)		n	y	y			n	y	y	y	y	n	n	h	h	h
30 Weapon Function Management		n	n	y			n	y	y	y	n	n	n	h	h	m

Individual System Ops. Skill Cross Training

Task Area	Performance Requirements Class	D R I V	C M D R	G U N R	O P T I M	S T A I N	T R A I N	S U B S T	I N D U	C O O L	F O O L	C O O L	C P D R E I R T I F
1 Battlefield Reconnaissance		n	y	y		n	y	y	y	y	n	n	h m h
5 Escape From System		y	y	y		n	y	y	y	n	n	n	h l l
6 Establish/Maintain Communications		n	y	n		n	y	y	y	n	n	n	h m l
10 Prevention of Detection/Location		y	y	y		n	y	y	y	y	n	y	h m m
11 Prevention of Interception/Jamming		n	y	n		n	y	y	y	n	n	n	h m m
17 Select and Order Appropriate Targets		n	y	y		n	y	y	y	y	n	n	h h h
18 Self recovery		y	y	y		n	y	y	y	y	n	n	h m m
19 System Protection From Threat		y	y	y		n	y	y	y	y	n	n	h h h
20 Target Acquisition		n	y	y		n	y	y	y	y	n	n	h h h
24 Vehicle Loading/Unloading		y	y	y		n	y	y	y	y	n	n	h m l
27 Weapon Delivery (General)		n	y	y		n	y	y	y	y	n	n	h h h
30 Weapon Function Management		n	n	y		n	y	y	y	n	n	n	h h m

Individual System Util. Skill Cross
Training

Task Area	Performance Requirements Class	D R I V	C M D	G U P	O P T	S T A	M A I N	T R A I N	S U B J E C T	I N T E R	C O O R D	F O O T	C O O R D	C O O R D	P E R F O R M	D E T E R M	
1 Battlefield Reconnaissance		n	y	y			n		y	y	y	y	n	n	h	m	h
9 Navigation		y	y	n			n		y	y	y	n	n	n	h	m	h
10 Prevention of Detection/Location		y	y	y			n		y	y	y	y	n	y	h	m	m
17 Select and Order Appropriate Targets		n	y	y			n		y	y	y	y	n	n	h	h	h
19 System Protection From Threat		y	y	y			n		y	y	y	y	n	n	h	h	h
20 Target Acquisition		n	y	y			n		y	y	y	y	n	n	h	h	h
21 Target Behavior Prediction		n	y	y			n		y	y	y	y	n	n	h	h	h
27 Weapon Delivery (General)		n	y	y			n		y	y	y	y	n	n	h	h	h
30 Weapon Function Management		n	n	y			n		y	y	y	n	n	n	h	h	m

Individual System Ops. Transition Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
1 Battlefield Reconnaissance		n	y	y			n	y	y	y	y	n	n	h	m	h
5 Escape From System		y	y	y			n	y	y	y	n	n	n	h	l	l
6 Establish/Maintain Communications		n	y	n			n	y	y	y	n	n	n	h	m	l
9 Navigation		y	y	n			n	y	y	y	n	n	n	h	m	h
10 Prevention of Detection/Location		y	y	y			n	y	y	y	y	n	y	h	m	m
11 Prevention of Interception/Jamming		n	y	n			n	y	y	y	n	n	n	h	m	m
17 Select and Order Appropriate Targets		n	y	y			n	y	y	y	y	n	n	h	h	h
18 Self recovery		y	y	y			n	y	y	y	y	n	n	h	m	m
19 System Protection From Threat		y	y	y			n	y	y	y	y	n	n	h	h	h
20 Target Acquisition		n	y	y			n	y	y	y	y	n	n	h	h	h
24 Vehicle Loading/Unloading		y	y	y			n	y	y	y	y	n	n	h	m	l
25 Vehicle Manuevering		y	n	n			n	y	y	y	n	n	n	h	m	m
27 Weapon Delivery (General)		n	y	y			n	y	y	y	y	n	n	h	h	h
30 Weapon Function Management		n	n	y			n	y	y	y	n	n	n	h	h	m

Individual System Util. Transition Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
1 Battlefield Reconnaissance		n	y	y			n	y	y	y	y	n	n	h	m	h
9 Navigation		y	y	n			n	y	y	y	n	n	n	h	m	h
10 Prevention of Detection/Location		y	y	y			n	y	y	y	y	n	y	h	m	m
17 Select and Order Appropriate Targets		n	y	y			n	y	y	y	y	n	n	h	h	h
19 System Protection From Threat		y	y	y			n	y	y	y	y	n	n	h	h	h
20 Target Acquisition		n	y	y			n	y	y	y	y	n	n	h	h	h
21 Target Behavior Prediction		n	y	y			n	y	y	y	y	n	n	h	h	h
25 Vehicle Manuevering		y	n	n			n	y	y	y	n	n	n	h	m	m
27 Weapon Delivery (General)		n	y	y			n	y	y	y	y	n	n	h	h	h
30 Weapon Function Management		n	n	y			n	y	y	y	n	n	n	h	h	m

Individual Leadership/Management Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	I	
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	I	
9	Navigation	y	y	n			n	y	y	y	n	n	n		h	m	h
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	y		h	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n		h	m	m
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	y	n	n		h	h	h
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n		h	h	h
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n		h	h	h
21	Target Behavior Prediction	n	y	y			n	y	y	y	y	n	n		h	h	h
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n		h	h	h

Individual Crew Maintenance System Anatomy

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n		h	m	l
9	Navigation	y	y	n			n	y	y	y	n	n	n		h	m	h
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	y		h	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n		h	m	m
18	Self recovery	y	y	y			n	y	y	y	y	n	n		h	m	m
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n		h	h	h
24	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n		h	m	l
25	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n		h	m	m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n		h	h	h
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n		h	h	m

Individual Crew Troubleshooting Skill
Acquisition

Task Area	Performance Requirements Class	D R I V	C M D R	G U P R	O P T S	S T A I F N	T R N S G T	S R U S G T	I N D V L	C N D L V	F O D L C	C O O R D	C R I T I C A L	P R E I F E R E N C E	D I F F I C U L T Y	
6	Establish/Maintain Communications	n	y	n		n	y	y	y	n	n	n	n	h	m	l
9	Navigation	y	y	n		n	y	y	y	n	n	n	n	h	m	h
10	Prevention of Detection/Location	y	y	y		n	y	y	y	y	n	y		h	m	m
11	Prevention of Interception/Jamming	n	y	n		n	y	y	y	n	n	n		h	m	m
19	System Protection From Threat	y	y	y		n	y	y	y	y	n	n		h	h	h
24	Vehicle Loading/Unloading	y	y	y		n	y	y	y	y	n	n		h	m	l
25	Vehicle Manuevering	y	n	n		n	y	y	y	n	n	n		h	m	m
27	Weapon Delivery (General)	n	y	y		n	y	y	y	y	n	n		h	h	h
30	Weapon Function Management	n	n	y		n	y	y	y	n	n	n		h	h	m

Individual Crew Repair Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F		
		V	R	R	S	F	N	G	T	V	L	C	T	I	F		
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n		h	m	l
9	Navigation	y	y	n			n	y	y	y	n	n	n		h	m	h
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	y		h	m	m
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n		h	h	h
25	Vehicle Manuevering	y	n	n			n	y	y	y	n	n	n		h	m	m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n		h	h	h
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n		h	h	m

Individual Crew Troubleshooting Sustainment

Task Area	Performance Requirements Class	D R I V	C M R	G U R	O P S	S T A I F N	T R N S G	S U N S T	I N D V	C O D L	F O L C	C A	C P R I T	D E I F F	
6	Establish/Maintain Communications	n	y	n		n	y	y	y	n	n	n	h	m	l
9	Navigation	y	y	n		n	y	y	y	n	n	n	h	m	h
10	Prevention of Detection/Location	y	y	y		n	y	y	y	y	n	y	h	m	m
11	Prevention of Interception/Jamming	n	y	n		n	y	y	y	n	n	n	h	m	m
19	System Protection From Threat	y	y	y		n	y	y	y	y	n	n	h	h	h
24	Vehicle Loading/Unloading	y	y	y		n	y	y	y	y	n	n	h	m	l
25	Vehicle Maneuvering	y	n	n		n	y	y	y	n	n	n	h	m	m
27	Weapon Delivery (General)	n	y	y		n	y	y	y	y	n	n	h	h	h
30	Weapon Function Management	n	n	y		n	y	y	y	n	n	n	h	h	m

Individual Crew Repair Sustainment

Task Area	Performance Requirements Class	D R I V	C M D N	G U P R	O T A I S F	S M A I N	T S R U N S G T	I C N D V	F O O L C	C O A R D	C P D R E I R F T I F	
6 Establish/Maintain Communications		n	y	n		n	y y	y	n	n	n	h m l
9 Navigation		y	y	n		n	y y	y	n	n	n	h m h
10 Prevention of Detection/Location		y	y	y		n	y y	y	y	n	y	h m m
19 System Protection From Threat		y	y	y		n	y y	y	y	n	n	h h h
25 Vehicle Manuevering		y	n	n		n	y y	y	n	n	n	h m m
27 Weapon Delivery (General)		n	y	y		n	y y	y	y	n	n	h h h
30 Weapon Function Management		n	n	y		n	y y	y	n	n	n	h h m

Individual Crew Maintenance Upgrade
Training

Task Area	Performance Requirements Class	D R I V	C M D N R	G U P R	O P T S F	S T A I N	T R N S G	S R U N S T	I N D I V	C O D E S	F O O T C A T	C R E D I T	P E R F O R M A N C E	
6 Establish/Maintain Communications		n	y	n			n	y	y	y	n	n	n	h m l
9 Navigation		y	y	n			n	y	y	y	n	n	n	h m h
10 Prevention of Detection/Location		y	y	y			n	y	y	y	y	n	y	h m m
19 System Protection From Threat		y	y	y			n	y	y	y	y	n	n	h h h
27 Weapon Delivery (General)		n	y	y			n	y	y	y	y	n	n	h h h
30 Weapon Function Management		n	n	y			n	y	y	y	n	n	n	h h m

Maintainer Common MOS Skill Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n			y	y	y	y	y	n	n	h	h	h
32 Maintenance - Repair/Service		n	n	n			y	y	y	y	y	n	n	h	m	m

Individual Maintainer System Anatomy Acquisition

Task Area	Performance Requirements Class	D R I V	C M D	G U P	O P T	S T A	M A I N	T R A N S M I T	S E N S I T I V E	I N T E R F A C E	C O N T R O L	F E E D B A C K	C O M M U N I C A T I O N	P R O C E S S I N G	D I S T R I B U T I O N	
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n			y	y	y	y	y	n	n	h	h	h
32 Maintenance - Repair/Service		n	n	n			y	y	y	y	y	n	n	h	m	m

Individual Maintainer Troubleshooting Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n			y	y	y	y	y	n	n	h	h	h
32 Maintenance - Repair/Service		n	n	n			y	y	y	y	y	n	n	h	m	m

Individual Maintainer Repair Skill Acquisition

Task Area	Performance Requirements Class	D R I V	C M D R	G U N R	O P T I C	S T R U C T	M A I N T	T R U S T	S U R E T	I N D U S	C O N S	F O R E	C A R E	C R E D I T	P R O F I T	D I F F I C U L T
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n			y	y	y	y	y	n	n	h	h	h
32 Maintenance - Repair/Service		n	n	n			y	y	y	y	y	n	n	h	m	m

Individual Maintainer Troubleshooting Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n			y	y	y	y	y	n	n	h	h	h
32 Maintenance - Repair/Service		n	n	n			y	y	y	y	y	n	n	h	m	m

Individual Maintainer Repair Skill
Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A		R	E	I
		I	D	N	R	A	I	N	S	D	L	R			I	R	F
		V	R	R	S	F	N	G	T	V	L	C			T	I	F
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n			y	y	y	y	y	n	n		h	h	h
32 Maintenance - Repair/Service		n	n	n			y	y	y	y	y	n	n		h	m	m

Individual Maintainer Skill Upgrade
Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n			y	y	y	y	y	n	n	h	h	h
32 Maintenance - Repair/Service		n	n	n			y	y	y	y	y	n	n	h	m	m

Individual Maintainer Transition Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n			y	y	y	y	y	n	n	h	h	h
32 Maintenance - Repair/Service		n	n	n			y	y	y	y	y	n	n	h	m	m

Maintainer Leadership/Management Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n			y	y	y	y	y	n	n	h	h	h
32 Maintenance - Repair/Service		n	n	n			y	y	y	y	y	n	n	h	m	m

Collective Common MOS Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	y		h	m	m
18	Self recovery	y	y	y			n	y	y	y	y	n	n		h	m	m
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n		h	h	h
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n		h	h	h
21	Target Behavior Prediction	n	y	y			n	y	y	y	y	n	n		h	h	h
24	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n		h	m	l
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n		h	h	h

Collective System Ops. Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	
5	Escape From System	y	y	y			n	y	y	y	n	n	n		h	l	l
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	y		h	m	m
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	y	n	n		h	h	h
18	Self recovery	y	y	y			n	y	y	y	y	n	n		h	m	m
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n		h	h	h
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n		h	h	h
24	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n		h	m	l
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n		h	h	h

Collective System Util. Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
1 Battlefield Reconnaissance		n	y	y			n	y	y	y	y	n	n	h	m	h
9 Navigation		y	y	n			n	y	y	y	n	n	n	h	m	h
10 Prevention of Detection/Location		y	y	y			n	y	y	y	y	n	y	h	m	m
17 Select and Order Appropriate Targets		n	y	y			n	y	y	y	y	n	n	h	h	h
19 System Protection From Threat		y	y	y			n	y	y	y	y	n	n	h	h	h
20 Target Acquisition		n	y	y			n	y	y	y	y	n	n	h	h	h
21 Target Behavior Prediction		n	y	y			n	y	y	y	y	n	n	h	h	h
27 Weapon Delivery (General)		n	y	y			n	y	y	y	y	n	n	h	h	h

Collective System Ops. Skill Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
5	Escape From System	y	y	y			n	y	y	y	n	n	n		h	l
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	y		h	m
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	y	n	n		h	h
18	Self recovery	y	y	y			n	y	y	y	y	n	n		h	m
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n		h	h
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n		h	h
24	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n		h	m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n		h	h

Collective System Util. Skill Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
1 Battlefield Reconnaissance		n	y	y			n	y	y	y	y	n	n	h	m	h
9 Navigation		y	y	n			n	y	y	y	n	n	n	h	m	h
10 Prevention of Detection/Location		y	y	y			n	y	y	y	y	n	y	h	m	m
17 Select and Order Appropriate Targets		n	y	y			n	y	y	y	y	n	n	h	h	h
19 System Protection From Threat		y	y	y			n	y	y	y	y	n	n	h	h	h
20 Target Acquisition		n	y	y			n	y	y	y	y	n	n	h	h	h
21 Target Behavior Prediction		n	y	y			n	y	y	y	y	n	n	h	h	h
27 Weapon Delivery (General)		n	y	y			n	y	y	y	y	n	n	h	h	h

Collective System Ops. Skill Upgrade

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	y	h	m	m
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	y	n	n	h	h	h
18	Self recovery	y	y	y			n	y	y	y	y	n	n	h	m	m
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n	h	h	h
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n	h	h	h
24	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n	h	m	l
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n	h	h	h

Collective System Util. Skill Upgrade

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
1 Battlefield Reconnaissance		n	y	y			n	y	y	y	y	n	n	h	m	h
9 Navigation		y	y	n			n	y	y	y	n	n	n	h	m	h
10 Prevention of Detection/Location		y	y	y			n	y	y	y	y	n	y	h	m	m
17 Select and Order Appropriate Targets		n	y	y			n	y	y	y	y	n	n	h	h	h
19 System Protection From Threat		y	y	y			n	y	y	y	y	n	n	h	h	h
20 Target Acquisition		n	y	y			n	y	y	y	y	n	n	h	h	h
21 Target Behavior Prediction		n	y	y			n	y	y	y	y	n	n	h	h	h
27 Weapon Delivery (General)		n	y	y			n	y	y	y	y	n	n	h	h	h

Collective System Ops. Cross Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
1 Battlefield Reconnaissance		n	y	y			n	y	y	y	y	n	n	h	m	h
9 Navigation		y	y	n			n	y	y	y	n	n	n	h	m	h
10 Prevention of Detection/Location		y	y	y			n	y	y	y	y	n	y	h	m	m
17 Select and Order Appropriate Targets		n	y	y			n	y	y	y	y	n	n	h	h	h
18 Self recovery		y	y	y			n	y	y	y	y	n	n	h	m	m
19 System Protection From Threat		y	y	y			n	y	y	y	y	n	n	h	h	h
20 Target Acquisition		n	y	y			n	y	y	y	y	n	n	h	h	h
24 Vehicle Loading/Unloading		y	y	y			n	y	y	y	y	n	n	h	m	l
27 Weapon Delivery (General)		n	y	y			n	y	y	y	y	n	n	h	h	h

Collective System Util. Cross Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
1 Battlefield Reconnaissance		n	y	y			n	y	y	y	y	n	n	h	m	h
9 Navigation		y	y	n			n	y	y	y	n	n	n	h	m	h
10 Prevention of Detection/Location		y	y	y			n	y	y	y	y	n	y	h	m	m
17 Select and Order Appropriate Targets		n	y	y			n	y	y	y	y	n	n	h	h	h
19 System Protection From Threat		y	y	y			n	y	y	y	y	n	n	h	h	h
20 Target Acquisition		n	y	y			n	y	y	y	y	n	n	h	h	h
21 Target Behavior Prediction		n	y	y			n	y	y	y	y	n	n	h	h	h
27 Weapon Delivery (General)		n	y	y			n	y	y	y	y	n	n	h	h	h

Collective System Ops. Transition Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
1 Battlefield Reconnaissance		n	y	y			n	y	y	y	y	n	n	h	m	h
5 Escape From System		y	y	y			n	y	y	y	n	n	n	h	l	l
9 Navigation		y	y	n			n	y	y	y	n	n	n	h	m	h
10 Prevention of Detection/Location		y	y	y			n	y	y	y	y	n	y	h	m	m
17 Select and Order Appropriate Targets		n	y	y			n	y	y	y	y	n	n	h	h	h
18 Self recovery		y	y	y			n	y	y	y	y	n	n	h	m	m
19 System Protection From Threat		y	y	y			n	y	y	y	y	n	n	h	h	h
20 Target Acquisition		n	y	y			n	y	y	y	y	n	n	h	h	h
24 Vehicle Loading/Unloading		y	y	y			n	y	y	y	y	n	n	h	m	l
27 Weapon Delivery (General)		n	y	y			n	y	y	y	y	n	n	h	h	h

Collective System Util. Transition Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
1 Battlefield Reconnaissance		n	y	y			n	y	y	y	y	n	n	h	m	h
9 Navigation		y	y	n			n	y	y	y	n	n	n	h	m	h
10 Prevention of Detection/Location		y	y	y			n	y	y	y	y	n	y	h	m	m
17 Select and Order Appropriate Targets		n	y	y			n	y	y	y	y	n	n	h	h	h
19 System Protection From Threat		y	y	y			n	y	y	y	y	n	n	h	h	h
20 Target Acquisition		n	y	y			n	y	y	y	y	n	n	h	h	h
21 Target Behavior Prediction		n	y	y			n	y	y	y	y	n	n	h	h	h
27 Weapon Delivery (General)		n	y	y			n	y	y	y	y	n	n	h	h	h

Unit System Utilization Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n	h	h	h
21	Target Behavior Prediction	n	y	y			n	y	y	y	y	n	n	h	h	h

Unit System Utilization Skill Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n	h	h	h
21	Target Behavior Prediction	n	y	y			n	y	y	y	y	n	n	h	h	h

Combined Arms System Utilization Skill Acquisition

Task Area	Performance Requirements Class	D C G O S M R M U P T A I D N R A I V R R S F N	T S R U N S G T	I C F C N O O A D L R V L C	C P D R E I I R F T I F
--------------	-----------------------------------	--	--------------------------	--------------------------------------	----------------------------------

Combined Arms System Utilization Sustainment

Task	Performance Requirements	D C G O S M	T S	I C F C	C P D
Area	Class	R M U P T A	R U	N O O A	R E I
		I D N R A I <td>N S<td>D L R<td>I R F</td></td></td>	N S <td>D L R<td>I R F</td></td>	D L R <td>I R F</td>	I R F
		V R R S F N <td>G T<td>V L C<td>T I F</td></td></td>	G T <td>V L C<td>T I F</td></td>	V L C <td>T I F</td>	T I F

Individual System Ops. Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
5	Escape From System	y	y	y			n	y	y	y	y	n	n	h	l	l
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n	h	m	m
9	Navigation	y	y	y			n	y	y	y	n	n	n	h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	y	n	h	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n	h	m	l
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	n	n	n	h	m	m
18	Self recovery	y	y	y			n	y	y	y	y	n	n	m	m	m
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n	h	m	l
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n	h	m	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n	h	m	m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n	h	h	m
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n	h	m	m

Individual System Util. Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n		h	m	m
9	Navigation	y	y	y			n	y	y	y	n	n	n		h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	y	n		h	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n		h	m	l
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	n	n	n		h	m	m
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n		h	m	m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n		h	h	m
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n		h	m	m

Individual System Ops. Skill Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
5	Escape From System	y	y	y			n	y	y	y	y	n	n	h	l	l
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n	h	m	m
9	Navigation	y	y	y			n	y	y	y	n	n	n	h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	y	n	h	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n	h	m	l
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	n	n	n	h	m	m
18	Self recovery	y	y	y			n	y	y	y	y	n	n	m	m	m
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n	h	m	l
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n	h	m	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n	h	m	m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n	h	h	m
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n	h	m	m

Individual System Util. Skill Sustainment

Task Area	Performance Requirements Class	D R I V	C M D R	G U P R	O P T S	S T A I F N	T R N S G T	S U S G T	I N D V L	C O D L C	F O R C	C A	C P D R E I R F T I F
6	Establish/Maintain Communications	n	y	n		n	y	y	y	n	n	n	h m m
9	Navigation	y	y	y		n	y	y	y	n	n	n	h m m
10	Prevention of Detection/Location	y	y	y		n	y	y	y	y	y	n	h m m
11	Prevention of Interception/Jamming	n	y	n		n	y	y	y	n	n	n	h m l
17	Select and Order Appropriate Targets	n	y	y		n	y	y	y	n	n	n	h m m
24	Vehicle Maneuvering	y	n	n		n	y	y	y	n	n	n	h m m
27	Weapon Delivery (General)	n	y	y		n	y	y	y	y	n	n	h h m
30	Weapon Function Management	n	n	y		n	y	y	y	n	n	n	h m m

Individual System Ops. Skill Upgrade

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
9	Navigation	y	y	y			n	y	y	y	n	n	n	h	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n	h	m	l
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	n	n	n	h	m	m
18	Self recovery	y	y	y			n	y	y	y	y	n	n	m	m	m
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n	h	m	l
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n	h	m	m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n	h	h	m
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n	h	m	m

Individual System Util. Skill Upgrade

Task Area	Performance Requirements Class	D R I V	C M D R	G U N S	O P T I C	S T R U C T U R	T S R U N S G T	I N D U S T R Y	C O O L I N G	F I R E A R M S	C O M M U N I C A T I O N	C O M P U T E R S	P E R F O R M A N C E		
9 Navigation		y	y	y		n	y	y	y	n	n	n	h	m	m
11 Prevention of Interception/Jamming		n	y	n		n	y	y	y	n	n	n	h	m	l
17 Select and Order Appropriate Targets		n	y	y		n	y	y	y	n	n	n	h	m	m
24 Vehicle Maneuvering		y	n	n		n	y	y	y	n	n	n	h	m	m
27 Weapon Delivery (General)		n	y	y		n	y	y	y	y	n	n	h	h	m
30 Weapon Function Management		n	n	y		n	y	y	y	n	n	n	h	m	m

Individual System Ops. Skill Cross Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
5	Escape From System	y	y	y			n	y	y	y	y	n	n	h	l	l
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n	h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	y	n	h	m	m
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	n	n	n	h	m	m
18	Self recovery	y	y	y			n	y	y	y	y	n	n	m	m	m
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n	h	m	l
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n	h	m	m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	n	n		h	h	m
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n	h	m	m

Individual System Util. Skill Cross
Training

Task Area	Performance Requirements Class	D R I V	C M D	G U N	O P T	S T A I N	T R A I N	S R U N S G T	I N D V I D	C O O L L	F O O T C A T	C R I T I C	P R I M A R	D I F F I C I L
6 Establish/Maintain Communications		n	y	n		n		y y	y	n	n	n	h	m m
9 Navigation		y	y	y		n		y y	y	n	n	n	h	m m
10 Prevention of Detection/Location		y	y	y		n		y y	y	y	y	n	h	m m
17 Select and Order Appropriate Targets		n	y	y		n		y y	y	n	n	n	h	m m
27 Weapon Delivery (General)		n	y	y		n		y y	y	y	n	n	h	h m
30 Weapon Function Management		n	n	y		n		y y	y	n	n	n	h	m m

Individual System Ops. Transition Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	I
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	I
5	Escape From System	y	y	y			n	y	y	y	y	n	n	h	l	l
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n	h	m	m
9	Navigation	y	y	y			n	y	y	y	n	n	n	h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	y	n	h	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n	h	m	l
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	n	n	n	h	m	m
18	Self recovery	y	y	y			n	y	y	y	y	n	n	m	m	m
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n	h	m	l
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n	h	m	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n	h	m	m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n	h	h	m
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n	h	m	m

Individual System Util. Transition Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F	
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F	
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n		h	m	m
9	Navigation	y	y	y			n	y	y	y	n	n	n		h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	y	n		h	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n		h	m	l
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	n	n	n		h	m	m
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n		h	m	m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n		h	h	m
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n		h	m	m

Individual Leadership/Management Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F		
		V	R	R	S	F	N	G	T	V	L	C	T	I	F		
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n		h	m	m
9	Navigation	y	y	y			n	y	y	y	n	n	n		h	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n		h	m	l
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	n	n	n		h	m	m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n		h	h	m

Individual Crew Maintenance System Anatomy

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F		
		V	R	R	S	F	N	G	T	V	L	C	T	I	F		
6	Establish/Maintain Communications	n	y	n		n		y	y	y	n	n	n		h	m	m
9	Navigation	y	y	y		n		y	y	y	n	n	n		h	m	m
11	Prevention of Interception/Jamming	n	y	n		n		y	y	y	n	n	n		h	m	l
17	Select and Order Appropriate Targets	n	y	y		n		y	y	y	n	n	n		h	m	m
19	System Protection From Threat	y	y	y		n		y	y	y	y	n	n		h	m	l
24	Vehicle Maneuvering	y	n	n		n		y	y	y	n	n	n		h	m	m
25	Vehicle Loading/Unloading	y	y	y		n		y	y	y	y	n	n		h	m	m
27	Weapon Delivery (General)	n	y	y		n		y	y	y	y	n	n		h	h	m
30	Weapon Function Management	n	n	y		n		y	y	y	n	n	n		h	m	m

Individual Crew Troubleshooting Skill
Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	
6 Establish/Maintain Communications		n	y	n			n	y	y	y	n	n	n		h	m	m
9 Navigation		y	y	y			n	y	y	y	n	n	n		h	m	m
11 Prevention of Interception/Jamming		n	y	n			n	y	y	y	n	n	n		h	m	l
17 Select and Order Appropriate Targets		n	y	y			n	y	y	y	n	n	n		h	m	m
19 System Protection From Threat		y	y	y			n	y	y	y	y	n	n		h	m	l
24 Vehicle Maneuvering		y	n	n			n	y	y	y	n	n	n		h	m	m
25 Vehicle Loading/Unloading		y	y	y			n	y	y	y	y	n	n		h	m	m
27 Weapon Delivery (General)		n	y	y			n	y	y	y	y	n	n		h	h	m
30 Weapon Function Management		n	n	y			n	y	y	y	n	n	n		h	m	m

Individual Crew Repair Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	I	
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	I	
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n		h	m	m
9	Navigation	y	y	y			n	y	y	y	n	n	n		h	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n		h	m	l
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	n	n	n		h	m	m
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n		h	m	l
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n		h	m	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n		h	m	m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n		h	h	m
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n		h	m	m

Individual Crew Troubleshooting Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F		
		V	R	R	S	F	N	G	T	V	L	C	T	I	F		
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n		h	m	m
9	Navigation	y	y	y			n	y	y	y	n	n	n		h	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n		h	m	l
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	n	n	n		h	m	m
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n		h	m	l
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n		h	m	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n		h	m	m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n		h	h	m
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n		h	m	m

Individual Crew Repair Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F	
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F	
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n		h	m	m
9	Navigation	y	y	y			n	y	y	y	n	n	n		h	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n		h	m	l
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	n	n	n		h	m	m
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n		h	m	l
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n		h	m	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n		h	m	m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n		h	h	m
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n		h	m	m

Individual Crew Maintenance Upgrade
Training

Task Area	Performance Requirements Class	D R I V	C M D R	G U P P	O P T I	S T A I N	M G T S F	T R G T	S U N G	I N D I	C O D E	F O O T	C A S E	C P D R E I R T I F
17 Select and Order Appropriate Targets		n	y	y			n	y	y	y	n	n	n	h m m
24 Vehicle Maneuvering		y	n	n			n	y	y	y	n	n	n	h m m
27 Weapon Delivery (General)		n	y	y			n	y	y	y	y	n	n	h h m
30 Weapon Function Management		n	n	y			n	y	y	y	n	n	n	h m m

Maintainer Common MOS Skill Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F	
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F	
31	Maintenance - Fault Isolation/Troubleshooting	n	n	n			y	y	y	y	y	n	n		h	m	m
32	Maintenance - Repair/Service	n	n	n			y	y	y	y	y	n	n		h	m	m

Individual Maintainer System Anatomy
Acquisition

Task Area	Performance Requirements Class	D R I V	C M D R	G U N S	O P T I C	S I G N A L	T R A N S M I T T E R	S E N S I T I V E	I N T E R F A C E	C O N T R O L	C O M M U N I C A T I O N	P R O C E S S I N G	D I S T R I B U T I O N	
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n		y	y	y	y	n	n	h	m	m
32 Maintenance - Repair/Service		n	n	n		y	y	y	y	n	n	h	m	m

Individual Maintainer Troubleshooting Skill
Acquisition

Task Area	Performance Requirements Class	D R I V	C M D R	G U N	O P T	S T A I N	T R U S T	I N S T R U C T I O N	C O O R D I N A T I O N	C O O R D I N A T I O N	C O O R D I N A T I O N			
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n		y	y	y	y	n	n	h	m	m
32 Maintenance - Repair/Service		n	n	n		y	y	y	y	n	n	h	m	m

Individual Maintainer Repair Skill
Acquisition

Task Area	Performance Requirements Class	D R I V	C M D R	G U N S	O P T I M I Z E	S T A B I L I T Y	T R A C K I N G	S U R V I V A L I T Y	I N S T R U C T I O N	C O O R D I N A T I O N	F I R E F I G H T I N G	C O M M U N I C A T I O N	P E R F O R M A N C E	D I S C I P L I N E	
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n		y	y	y	y	y	n	n	h	m	m
32 Maintenance - Repair/Service		n	n	n		y	y	y	y	y	n	n	h	m	m

Individual Maintainer Troubleshooting
Sustainment

Task Area	Performance Requirements Class	D R I V	C M D R	G U N R	O P T S F	S T A I N	T R N S G	S U S T	I N D I C	C O N D I	F O R M	C O N T	C O N T	C O N T	P E R F	D E F I C	
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n		y	y	y	y	y	n	n			h	m	m
32 Maintenance - Repair/Service		n	n	n		y	y	y	y	y	n	n			h	m	m

Individual Maintainer Repair Skill
Sustainment

Task Area	Performance Requirements Class	D R I V	C M D R	G U N	O P T	S T A I N	T R A I N	S U P P O R T	I N S T R U C T O R	C O O R D I N A T O R	F I E L D	C O N T R O L	C O M M U N I C A T O R	P L A N N E R	D E S I G N E R	
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n		y	y	y	y	y	n	n		h	m	m
32 Maintenance - Repair/Service		n	n	n		y	y	y	y	y	n	n		h	m	m

Individual Maintainer Skill Upgrade
Training

Task Area	Performance Requirements Class	D R I V	C M D	G U N	O P T	S T A I N	T R A I N	S U P P O R T	I N S T R U C T O R	C O O R D I N A T O R	F I E L D	C O N T R O L	C O M M U N I C A T I O N	P E R F O R M A N C E	D E M O N S T R A T I O N	
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n		y	y	y	y	y	n	n		h	m	m
32 Maintenance - Repair/Service		n	n	n		y	y	y	y	y	n	n		h	m	m

Individual Maintainer Transition Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n			y	y	y	y	y	n	n	h	m	m
32 Maintenance - Repair/Service		n	n	n			y	y	y	y	y	n	n	h	m	m

Maintainer Leadership/Management Training

Task Area	Performance Requirements Class	D R I V	C M D R	G U P P	O T A I N	S M A I N	T S R U N S G T	I C N D V	F O L L	C A R	C P D R E I R F T
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n		y	y y	y y	n n		h m m
32 Maintenance - Repair/Service		n	n	n		y	y y	y y	n n		h m m

Collective Common MOS Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	
9 Navigation		y	y	y			n	y	y	y	n	n	n		h	m	m
10 Prevention of Detection/Location		y	y	y			n	y	y	y	y	y	n		h	m	m

Collective System Ops. Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	
5	Escape From System	y	y	y			n	y	y	y	y	n	n		h	l	l
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	y	n		h	m	m
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	n	n	n		h	m	m
18	Self recovery	y	y	y			n	y	y	y	y	n	n		m	m	m
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n		h	m	l
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n		h	m	m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n		h	h	m

Collective System Util. Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	y	n		h	m	m
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	n	n	n		h	m	m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n		h	h	m

Collective System Ops. Skill Sustainment

Task Area	Performance Requirements Class	D R I V	C M D	G U P	O P T	S T A	M A I N	T R A N S M I T	S I G N A L	I N T E R F A C E	C O N T R O L	F E E D B A C K	C O M M U N I C A T I O N	P R O C E D U R E	D I S T R I B U T I O N	
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	y	n	h	m	m
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	n	n	n	h	m	m
18	Self recovery	y	y	y			n	y	y	y	y	n	n	m	m	m
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n	h	m	l
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n	h	m	m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n	h	h	m

Collective System Util. Skill Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	y	n	h	m	m
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	n	n	n	h	m	m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n	h	h	m

Collective System Ops. Skill Upgrade

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	y	n	h	m	m
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	n	n	n	h	m	m
19	System Protection From Threat	y	y	y			n	y	y	y	y	n	n	h	m	l
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n	h	h	m

Collective System Util. Skill Upgrade

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A		R	E	I
		I	D	N	R	A	I	N	S	D	L	R			I	R	F
		V	R	R	S	F	N	G	T	V	L	C			T	I	F
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	y	n		h	m	m
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	n	n	n		h	m	m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n		h	h	m

Collective System Ops. Cross Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	
10 Prevention of Detection/Location		y	y	y			n	y	y	y	y	y	n		h	m	m
17 Select and Order Appropriate Targets		n	y	y			n	y	y	y	n	n	n		h	m	m
18 Self recovery		y	y	y			n	y	y	y	y	n	n		m	m	m
19 System Protection From Threat		y	y	y			n	y	y	y	y	n	n		h	m	l
25 Vehicle Loading/Unloading		y	y	y			n	y	y	y	y	n	n		h	m	m
27 Weapon Delivery (General)		n	y	y			n	y	y	y	y	n	n		h	h	m

Collective System Util. Cross Training

Task Area	Performance Requirements Class	D R I V	C M D	G U P	O T A	S A I	M N F	T R G	S U S	I N V	C O D	F O L	C A	C P R	D E I F
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	y	n	h	m m
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	n	n	n	h	m m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n	h	h m

Collective System Ops. Transition Training

Task Area	Performance Requirements Class	D R I V	C M D R	G U N	O P T	S T A I N	T R A I N	S I M U L A T O R	I N S T R U C T O R	C O O R D I N A T O R	C O O R D I N A T O R	P E R F O R M A N C E	D E T A I L S
5	Escape From System	y	y	y		n	y	y	y	y	n	n	h l l
10	Prevention of Detection/Location	y	y	y		n	y	y	y	y	y	n	h m m
17	Select and Order Appropriate Targets	n	y	y		n	y	y	y	n	n	n	h m m
18	Self recovery	y	y	y		n	y	y	y	y	n	n	m m m
19	System Protection From Threat	y	y	y		n	y	y	y	y	n	n	h m l
25	Vehicle Loading/Unloading	y	y	y		n	y	y	y	y	n	n	h m m
27	Weapon Delivery (General)	n	y	y		n	y	y	y	y	n	n	h h m

Collective System Util. Transition Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A		R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	y	n		h	m	m
17	Select and Order Appropriate Targets	n	y	y			n	y	y	y	n	n	n		h	m	m
27	Weapon Delivery (General)	n	y	y			n	y	y	y	y	n	n		h	h	m

Unit System Utilization Skill Acquisition

Task	Performance Requirements	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
Area	Class	R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	

10	Prevention of Detection/Location	y	y	y		n		y	y	y	y	y	n		h	m	m
----	----------------------------------	---	---	---	--	---	--	---	---	---	---	---	---	--	---	---	---

Unit System Utilization Skill Sustainment

Task	Performance Requirements	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
Area	Class	R	M	U	P	T	A	R	U	N	O	O	A		R	E	I
		I	D	N	R	A	I	N	S	D	L	R			I	R	F
		V	R	R	S	F	N	G	T	V	L	C			T	I	F

10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	y	n		h	m	m
----	----------------------------------	---	---	---	--	--	---	---	---	---	---	---	---	--	---	---	---

Combined Arms System Utilization Skill
Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A		R	E	I
		I	D	N	R	A	I	N	S	D	L	R			I	R	F
		V	R	R	S	F	N	G	T	V	L	C			T	I	F

Combined Arms System Utilization Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A		R	E	I
		I	D	N	R	A	I	N	S	D	L	R			I	R	F
		V	R	R	S	F	N	G	T	V	L	C			T	I	F

APPENDIX H

TRAINING REQUIREMENTS ANALYSIS DATA FOR AFV NLOS-AT/AD VEHICLE

Individual Common MOS Skill Acquisition

Task Area	Performance Requirements Class	D R I V	C M D	G U P	O P T	S T A	M A I	T S R U N S G T	I C N D V	F O L C	C A	C P D R E I R F T I F	
6 Establish/Maintain Communications		n	y				n	y y	y	n	n	n	h m m
9 Navigation		y	y					y y	y	y	n	n	h m h
10 Prevention of Detection/Location		y	y				n	y y	y	y	n	n	m m m

Individual System Ops. Skill Acquisition

Task Area	Performance Requirements Class	D R I V	C M D R	G U N S	O P T I C S	S T A I F N	T R A I N I N G	S U B S T I T U T E	I N S T R U C T O R	C O O R D I N A T O R	F I E L D	C O N T R O L	P E R F O R M A N C E	D E T A I L S	
5	Escape From System	y	y			n	y	y	y	y	n	n	m	m	l
6	Establish/Maintain Communications	n	y			n	y	y	y	n	n	n	h	m	m
9	Navigation	y	y				y	y	y	y	n	n	h	m	h
11	Prevention of Interception/Jamming	n	y				y	y	y	n	n	n	h	m	m
15	Repr. of Terrain/Obstacles/Installations/Weather	n	y			n	y	y	y	n	n	n	h	m	m
17	Select and Order Appropriate Targets	n	y			n	y	y	y	n	n	n	h	h	h
18	Self recovery	y	y			n	y	y	y	y	n	n	m	l	m
19	System Protection From Threat	y	y			n	y	y	y	y	n	n	m	m	m
20	Target Acquisition	n	y			n	y	y	y	n	n	n	h	h	h
21	Target Behavior Prediction	n	y			n	y	y	y	n	n	n	h	h	h
23	Target Information Gathering and Interpretation	n	y			n	y	y	y	n	n	n	h	h	h
24	Vehicle Maneuvering	y	n			n	y	y	y	n	n	n	m	m	m
25	Vehicle Loading/Unloading	y	y			n	y	y	y	y	n	n	m	m	l
28	Weapon Delivery - Ground to Ground Missile	n	y			n	y	y	y	n	n	n	h	h	h
30	Weapon Function Management	n	y				y	y	y	n	n	n	h	h	h

Individual System Util. Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	
6	Establish/Maintain Communications	n	y				n	y	y	y	n	n	n		h	m	m
9	Navigation	y	y					y	y	y	y	n	n		h	m	h
10	Prevention of Detection/Location	y	y				n	y	y	y	y	n	n		m	m	m
15	Repr. of Terrain/Obstacles/Installations/ Weather	n	y				n	y	y	y	n	n	n		h	m	m
17	Select and Order Appropriate Targets	n	y				n	y	y	y	n	n	n		h	h	h
20	Target Acquisition	n	y				n	y	y	y	n	n	n		h	h	h
21	Target Behavior Prediction	n	y				n	y	y	y	n	n	n		h	h	h
23	Target Information Gathering and Interpretation	n	y				n	y	y	y	n	n	n		h	h	h
24	Vehicle Maneuvering	y	n				n	y	y	y	n	n	n		m	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y				n	y	y	y	n	n	n		h	h	h
30	Weapon Function Management	n	y					y	y	y	n	n	n		h	h	h

Individual System Ops. Skill Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
5	Escape From System	y	y				n	y	y	y	y	n	n	m	m	l
6	Establish/Maintain Communications	n	y				n	y	y	y	n	n	n	h	m	m
9	Navigation	y	y					y	y	y	y	n	n	h	m	h
11	Prevention of Interception/Jamming	n	y					y	y	y	n	n	n	h	m	m
15	Repr. of Terrain/Obstacles/Installations/ Weather	n	y				n	y	y	y	n	n	n	h	m	m
17	Select and Order Appropriate Targets	n	y				n	y	y	y	n	n	n	h	h	h
18	Self recovery	y	y				n	y	y	y	y	n	n	m	l	m
19	System Protection From Threat	y	y				n	y	y	y	y	n	n	m	m	m
20	Target Acquisition	n	y				n	y	y	y	n	n	n	h	h	h
21	Target Behavior Prediction	n	y				n	y	y	y	n	n	n	h	h	h
23	Target Information Gathering and Interpretation	n	y				n	y	y	y	n	n	n	h	h	h
24	Vehicle Maneuvering	y	n				n	y	y	y	n	n	n	m	m	m
25	Vehicle Loading/Unloading	y	y				n	y	y	y	y	n	n	m	m	l
28	Weapon Delivery - Ground to Ground Missile	n	y				n	y	y	y	n	n	n	h	h	h
30	Weapon Function Management	n	y					y	y	y	n	n	n	h	h	h

Individual System Util. Skill Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
6	Establish/Maintain Communications	n	y				n	y	y	y	n	n	n	h	m	m
9	Navigation	y	y					y	y	y	y	n	n	h	m	h
10	Prevention of Detection/Location	y	y				n	y	y	y	y	n	n	m	m	m
15	Repr. of Terrain/Obstacles/Installations/Weather	n	y				n	y	y	y	n	n	n	h	m	m
17	Select and Order Appropriate Targets	n	y				n	y	y	y	n	n	n	h	h	h
20	Target Acquisition	n	y				n	y	y	y	n	n	n	h	h	h
21	Target Behavior Prediction	n	y				n	y	y	y	n	n	n	h	h	h
23	Target Information Gathering and Interpretation	n	y				n	y	y	y	n	n	n	h	h	h
24	Vehicle Maneuvering	y	n				n	y	y	y	n	n	n	m	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y				n	y	y	y	n	n	n	h	h	h
30	Weapon Function Management	n	y					y	y	y	n	n	n	h	h	h

Individual System Ops. Skill Upgrade

Task Area	Performance Requirements Class	D R I V	C M D R	G U P R	O P T S	S T A I F N	T R N S G T	S R U N S	I N D V	C O D L	F O R V	C O O R D	C P R T I F	D E I F I F	
6	Establish/Maintain Communications	n	y			n	y	y	y	n	n	n	h	m	m
9	Navigation	y	y				y	y	y	y	n	n	h	m	h
11	Prevention of Interception/Jamming	n	y				y	y	y	n	n	n	h	m	m
15	Repr. of Terrain/Obstacles/Installations/Weather	n	y			n	y	y	y	n	n	n	h	m	m
17	Select and Order Appropriate Targets	n	y			n	y	y	y	n	n	n	h	h	h
18	Self recovery	y	y			n	y	y	y	y	n	n	m	l	m
20	Target Acquisition	n	y			n	y	y	y	n	n	n	h	h	h
21	Target Behavior Prediction	n	y			n	y	y	y	n	n	n	h	h	h
23	Target Information Gathering and Interpretation	n	y			n	y	y	y	n	n	n	h	h	h
24	Vehicle Maneuvering	y	n			n	y	y	y	n	n	n	m	m	m
25	Vehicle Loading/Unloading	y	y			n	y	y	y	y	n	n	m	m	l
28	Weapon Delivery - Ground to Ground Missile	n	y			n	y	y	y	n	n	n	h	h	h
30	Weapon Function Management	n	y				y	y	y	n	n	n	h	h	h

Individual System Util. Skill Upgrade

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	
6	Establish/Maintain Communications	n	y				n	y	y	y	n	n	n		h	m	m
9	Navigation	y	y					y	y	y	y	n	n		h	m	h
10	Prevention of Detection/Location	y	y				n	y	y	y	y	n	n		m	m	m
15	Repr. of Terrain/Obstacles/Installations/ Weather	n	y				n	y	y	y	n	n	n		h	m	m
17	Select and Order Appropriate Targets	n	y				n	y	y	y	n	n	n		h	h	h
20	Target Acquisition	n	y				n	y	y	y	n	n	n		h	h	h
21	Target Behavior Prediction	n	y				n	y	y	y	n	n	n		h	h	h
23	Target Information Gathering and Interpretation	n	y				n	y	y	y	n	n	n		h	h	h
24	Vehicle Maneuvering	y	n				n	y	y	y	n	n	n		m	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y				n	y	y	y	n	n	n		h	h	h
30	Weapon Function Management	n	y					y	y	y	n	n	n		h	h	h

Individual System Ops. Skill Cross Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F		
		V	R	R	S	F	N	G	T	V	L	C	T	I	F		
11	Prevention of Interception/Jamming	n	y					y	y	y	n	n	n		h	m	m
17	Select and Order Appropriate Targets	n	y				n	y	y	y	n	n	n		h	h	h
18	Self recovery	y	y				n	y	y	y	y	n	n		m	l	m
25	Vehicle Loading/Unloading	y	y				n	y	y	y	y	n	n		m	m	l
28	Weapon Delivery - Ground to Ground Missile	n	y				n	y	y	y	n	n	n		h	h	h
30	Weapon Function Management	n	y					y	y	y	n	n	n		h	h	h

Individual System Util. Skill Cross
Training

Task Area	Performance Requirements Class	D R I V	C M D	G U P	O P T	S T A	M A I N	T R U S T	S U R V E I L	I N T E L	C O M M	F I R E	C O N T R O L	C P D R E I R T I F
10 Prevention of Detection/Location		y	y				n	y	y	y	y	n	n	m m m
11 Prevention of Interception/Jamming		n	y					y	y	y	n	n	n	h m m
17 Select and Order Appropriate Targets		n	y				n	y	y	y	n	n	n	h h h
28 Weapon Delivery - Ground to Ground Missile		n	y				n	y	y	y	n	n	n	h h h
30 Weapon Function Management		n	y					y	y	y	n	n	n	h h h

Individual System Ops. Transition Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	
5	Escape From System	y	y				n	y	y	y	y	n	n	m	m	l
6	Establish/Maintain Communications	n	y				n	y	y	y	n	n	n	h	m	m
9	Navigation	y	y					y	y	y	y	n	n	h	m	h
11	Prevention of Interception/Jamming	n	y					y	y	y	n	n	n	h	m	m
15	Repr. of Terrain/Obstacles/Installations/ Weather	n	y				n	y	y	y	n	n	n	h	m	m
17	Select and Order Appropriate Targets	n	y				n	y	y	y	n	n	n	h	h	h
18	Self recovery	y	y				n	y	y	y	y	n	n	m	l	m
19	System Protection From Threat	y	y				n	y	y	y	y	n	n	m	m	m
20	Target Acquisition	n	y				n	y	y	y	n	n	n	h	h	h
21	Target Behavior Prediction	n	y				n	y	y	y	n	n	n	h	h	h
23	Target Information Gathering and Interpretation	n	y				n	y	y	y	n	n	n	h	h	h
25	Vehicle Loading/Unloading	y	y				n	y	y	y	y	n	n	m	m	l
28	Weapon Delivery - Ground to Ground Missile	n	y				n	y	y	y	n	n	n	h	h	h
30	Weapon Function Management	n	y					y	y	y	n	n	n	h	h	h

Individual System Util. Transition Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	C	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	
6	Establish/Maintain Communications	n	y				n	y	y	y	n	n	n		h	m	m
9	Navigation	y	y					y	y	y	y	n	n		h	m	h
10	Prevention of Detection/Location	y	y				n	y	y	y	y	n	n		m	m	m
11	Prevention of Interception/Jamming	n	y					y	y	y	n	n	n		h	m	m
15	Repr. of Terrain/Obstacles/Installations/ Weather	n	y				n	y	y	y	n	n	n		h	m	m
17	Select and Order Appropriate Targets	n	y				n	y	y	y	n	n	n		h	h	h
20	Target Acquisition	n	y				n	y	y	y	n	n	n		h	h	h
21	Target Behavior Prediction	n	y				n	y	y	y	n	n	n		h	h	h
23	Target Information Gathering and Interpretation	n	y				n	y	y	y	n	n	n		h	h	h
28	Weapon Delivery - Ground to Ground Missile	n	y				n	y	y	y	n	n	n		h	h	h
30	Weapon Function Management	n	y					y	y	y	n	n	n		h	h	h

Individual Leadership/Management Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	
6	Establish/Maintain Communications	n	y				n	y	y	y	n	n	n		h	m	m
9	Navigation	y	y					y	y	y	y	n	n		h	m	h
10	Prevention of Detection/Location	y	y				n	y	y	y	y	n	n		m	m	m
11	Prevention of Interception/Jamming	n	y					y	y	y	n	n	n		h	m	m
15	Repr. of Terrain/Obstacles/Installations/ Weather	n	y				n	y	y	y	n	n	n		h	m	m
17	Select and Order Appropriate Targets	n	y				n	y	y	y	n	n	n		h	h	h
20	Target Acquisition	n	y				n	y	y	y	n	n	n		h	h	h
21	Target Behavior Prediction	n	y				n	y	y	y	n	n	n		h	h	h
23	Target Information Gathering and Interpretation	n	y				n	y	y	y	n	n	n		h	h	h
28	Weapon Delivery - Ground to Ground Missile	n	y				n	y	y	y	n	n	n		h	h	h
30	Weapon Function Management	n	y					y	y	y	n	n	n		h	h	h

Individual Crew Maintenance System Anatomy

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F		
		V	R	R	S	F	N	G	T	V	L	C	T	I	F		
6	Establish/Maintain Communications	n	y				n	y	y	y	n	n	n		h	m	m
9	Navigation	y	y					y	y	y	y	n	n		h	m	h
11	Prevention of Interception/Jamming	n	y					y	y	y	n	n	n		h	m	m
15	Repr. of Terrain/Obstacles/Installations/ Weather	n	y				n	y	y	y	n	n	n		h	m	m
17	Select and Order Appropriate Targets	n	y				n	y	y	y	n	n	n		h	h	h
19	System Protection From Threat	y	y				n	y	y	y	y	n	n		m	m	m
20	Target Acquisition	n	y				n	y	y	y	n	n	n		h	h	h
21	Target Behavior Prediction	n	y				n	y	y	y	n	n	n		h	h	h
23	Target Information Gathering and Interpretation	n	y				n	y	y	y	n	n	n		h	h	h
24	Vehicle Maneuvering	y	n				n	y	y	y	n	n	n		m	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y				n	y	y	y	n	n	n		h	h	h
30	Weapon Function Management	n	y					y	y	y	n	n	n		h	h	h

Individual Crew Troubleshooting Skill Acquisition

Task Area	Performance Requirements Class	D R I V	C M U N I T Y	G U N R S	O P T I C S	S T A T I S T I C S	T R A C T I V E	S U B S T R A C T I V E	I N S T R U M E N T S	C O O L I N G	F O O T C A S I N G	C A S E	C R E W	P E R F O R M A N C E	D I F F I C U L T Y		
6	Establish/Maintain Communications	n	y			n		y	y	y	n	n	n		h	m	m
9	Navigation	y	y					y	y	y	y	n	n		h	m	h
11	Prevention of Interception/Jamming	n	y					y	y	y	n	n	n		h	m	m
15	Repr. of Terrain/Obstacles/Installations/Weather	n	y			n		y	y	y	n	n	n		h	m	m
17	Select and Order Appropriate Targets	n	y			n		y	y	y	n	n	n		h	h	h
19	System Protection From Threat	y	y			n		y	y	y	y	n	n		m	m	m
20	Target Acquisition	n	y			n		y	y	y	n	n	n		h	h	h
21	Target Behavior Prediction	n	y			n		y	y	y	n	n	n		h	h	h
23	Target Information Gathering and Interpretation	n	y			n		y	y	y	n	n	n		h	h	h
24	Vehicle Maneuvering	y	n			n		y	y	y	n	n	n		m	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y			n		y	y	y	n	n	n		h	h	h
30	Weapon Function Management	n	y					y	y	y	n	n	n		h	h	h

Individual Crew Repair Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	I
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	I
6 Establish/Maintain Communications		n	y				n	y	y	y	n	n	n	h	m	m
9 Navigation		y	y					y	y	y	y	n	n	h	m	h
11 Prevention of Interception/Jamming		n	y					y	y	y	n	n	n	h	m	m
15 Repr. of Terrain/Obstacles/Installations/Weather		n	y				n	y	y	y	n	n	n	h	m	m
17 Select and Order Appropriate Targets		n	y				n	y	y	y	n	n	n	h	h	h
19 System Protection From Threat		y	y				n	y	y	y	y	n	n	m	m	m
20 Target Acquisition		n	y				n	y	y	y	n	n	n	h	h	h
21 Target Behavior Prediction		n	y				n	y	y	y	n	n	n	h	h	h
23 Target Information Gathering and Interpretation		n	y				n	y	y	y	n	n	n	h	h	h
24 Vehicle Maneuvering		y	n				n	y	y	y	n	n	n	m	m	m
28 Weapon Delivery - Ground to Ground Missile		n	y				n	y	y	y	n	n	n	h	h	h
30 Weapon Function, Management		n	y					y	y	y	n	n	n	h	h	h

Individual Crew Troubleshooting Sustainment

Task Area	Performance Requirements Class	D R I V	C M U P R	G O P R	S T A I S F	M A I N	T R N S G T	S U S G T	I N D V	C O D L	F O L C	C O O A R E I R F T I F	P R E I R F T I F	D I F T I F	
6	Establish/Maintain Communications	n	y			n	y	y	y	n	n	n	h	m	m
9	Navigation	y	y				y	y	y	y	n	n	h	m	h
11	Prevention of Interception/Jamming	n	y				y	y	y	n	n	n	h	m	m
15	Repr. of Terrain/Obstacles/Installations/Weather	n	y			n	y	y	y	n	n	n	h	m	m
17	Select and Order Appropriate Targets	n	y			n	y	y	y	n	n	n	h	h	h
19	System Protection From Threat	y	y			n	y	y	y	y	n	n	m	m	m
20	Target Acquisition	n	y			n	y	y	y	n	n	n	h	h	h
21	Target Behavior Prediction	n	y			n	y	y	y	n	n	n	h	h	h
23	Target Information Gathering and Interpretation	n	y			n	y	y	y	n	n	n	h	h	h
24	Vehicle Maneuvering	y	n			n	y	y	y	n	n	n	m	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y			n	y	y	y	n	n	n	h	h	h
30	Weapon Function Management	n	y				y	y	y	n	n	n	h	h	h

Individual Crew Repair Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F		
		V	R	R	S	F	N	G	T	V	L	C	T	I	F		
6	Establish/Maintain Communications	n	y				n	y	y	y	n	n	n		h	m	m
9	Navigation	y	y					y	y	y	y	n	n		h	m	h
11	Prevention of Interception/Jamming	n	y					y	y	y	n	n	n		h	m	m
15	Repr. of Terrain/Obstacles/Installations/ Weather	n	y				n	y	y	y	n	n	n		h	m	m
17	Select and Order Appropriate Targets	n	y				n	y	y	y	n	n	n		h	h	h
19	System Protection From Threat	y	y				n	y	y	y	y	n	n		m	m	m
20	Target Acquisition	n	y				n	y	y	y	n	n	n		h	h	h
21	Target Behavior Prediction	n	y				n	y	y	y	n	n	n		h	h	h
23	Target Information Gathering and Interpretation	n	y				n	y	y	y	n	n	n		h	h	h
24	Vehicle Maneuvering	y	n				n	y	y	y	n	n	n		m	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y				n	y	y	y	n	n	n		h	h	h
30	Weapon Function Management	n	y					y	y	y	n	n	n		h	h	h

Individual Crew Maintenance Upgrade
Training

Task Area	Performance Requirements Class	D R I V	C M D N	G U P R	O P T S	S T A I N	T R N S G	I N D V	C O D L	F O R V	C O A L	C R I T	P E R F	D I F F
6 Establish/Maintain Communications		n	y			n	y y	y	n	n	n	h	m	m
9 Navigation		y	y				y y	y	y	n	n	h	m	h
11 Prevention of Interception/Jamming		n	y				y y	y	n	n	n	h	m	m
15 Repr. of Terrain/Obstacles/Installations/Weather		n	y			n	y y	y	n	n	n	h	m	m
17 Select and Order Appropriate Targets		n	y			n	y y	y	n	n	n	h	h	h
19 System Protection From Threat		y	y			n	y y	y	y	n	n	m	m	m
21 Target Behavior Prediction		n	y			n	y y	y	n	n	n	h	h	h
23 Target Information Gathering and Interpretation		n	y			n	y y	y	n	n	n	h	h	h
24 Vehicle Maneuvering		y	n			n	y y	y	n	n	n	m	m	m
28 Weapon Delivery - Ground to Ground Missile		n	y			n	y y	y	n	n	n	h	h	h
30 Weapon Function Management		n	y				y y	y	n	n	n	h	h	h

Maintainer Common MOS Skill Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F		
		V	R	R	S	F	N	G	T	V	L	C	T	I	F		
31	Maintenance - Fault Isolation/Troubleshooting	n	n			y		y	y	y	y	n	n		h	h	m
32	Maintenance - Repair/Service	n	n			y		y	y	y	y	n	n		h	m	m

Individual Maintainer System Anatomy Acquisition

Task Area	Performance Requirements Class	D R I V	C M D R	G U N R	O P T I C	S T A I F N	T R A N S G T	S U N S G T	I N D V L	C O O L C	F O O A R	C P D R E I R F T I F			
31 Maintenance - Fault Isolation/Troubleshooting		n	n			y	y	y	y	y	n	n	h	h	m
32 Maintenance - Repair/Service		n	n			y	y	y	y	y	n	n	h	m	m

Individual Maintainer Troubleshooting Skill
Acquisition

Task Area	Performance Requirements Class	D R I V	C M D R	G U P P	O P T I	S T A I N	M T R S F N	T R N S G T	S U N S T	I N D V L	C O D L	F O R C	C A C	C R I T	P E R F	D I F	
31 Maintenance - Fault Isolation/Troubleshooting		n	n			y		y	y	y	y	n	n		h	h	m
32 Maintenance - Repair/Service		n	n			y		y	y	y	y	n	n		h	m	m

Individual Maintainer Repair Skill
Acquisition

Task Area	Performance Requirements Class	D R I V	C M D R	G U N	O P T	S T A I N	T R U N S G T	S R U N S G T	I N D V L	C N D V	F O L C	C O A R	C R I T	P E R F	D I F
31 Maintenance - Fault Isolation/Troubleshooting		n	n			y	y	y	y	y	n	n	h	h	m
32 Maintenance - Repair/Service		n	n			y	y	y	y	y	n	n	h	m	m

Individual Maintainer Troubleshooting
Sustainment

Task Area	Performance Requirements Class	D R I V	C M D R	G U N R	O P T S	S T A I F N	T R N S G T	S U N S C T	I N D V L	C O D L	F O R C	C A R C	C R I T	P E R F	D I F
31 Maintenance - Fault Isolation/Troubleshooting		n	n			y	y y	y y n n					h	h	m
32 Maintenance - Repair/Service		n	n			y	y y	y y n n					h	m	m

Individual Maintainer Repair Skill
Sustainment

Task Area	Performance Requirements Class	D R I V	C M D R	G U P R	O P T S	S T A I F N	T R N S G	S U S T	I N D V	C O D L	F O L C	C O O R	C R I T	P E R F	D I F
31 Maintenance - Fault Isolation/Troubleshooting		n	n			y	y	y	y	y	n	n	h	h	m
32 Maintenance - Repair/Service		n	n			y	y	y	y	y	n	n	h	m	m

Individual Maintainer Skill Upgrade
Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
31 Maintenance - Fault Isolation/Troubleshooting		n	n				y	y	y	y	y	n	n	h	h	m
32 Maintenance - Repair/Service		n	n				y	y	y	y	y	n	n	h	m	m

Individual Maintainer Transition Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	
31 Maintenance - Fault Isolation/Troubleshooting		n	n				y	y	y	y	y	n	n	h	h	m
32 Maintenance - Repair/Service		n	n				y	y	y	y	y	n	n	h	m	m

Maintainer Leadership/Management Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	
31 Maintenance - Fault Isolation/Troubleshooting		n	n				y	y	y	y	y	n	n	h	h	m
32 Maintenance - Repair/Service		n	n				y	y	y	y	y	n	n	h	m	m

Collective Common MOS Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
19 System Protection From Threat		y	y				n	y	y	y	y	n	n	m	m	m

Collective System Ops. Skill Acquisition

Task Area	Performance Requirements Class .	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
5	Escape From System	y	y				n	y	y	y	y	n	n	m	m	l
18	Self recovery	y	y				n	y	y	y	y	n	n	m	l	m
19	System Protection From Threat	y	y				n	y	y	y	y	n	n	m	m	m
25	Vehicle Loading/Unloading	y	y				n	y	y	y	y	n	n	m	m	l

Collective System Util. Skill Acquisition

Task	Performance Requirements	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
Area	Class	R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
9	Navigation	y	y					y	y	y	y	n	n	h	m	h
10	Prevention of Detection/Location	y	y				n	y	y	y	y	n	n	m	m	m

Collective System Ops. Skill Sustainment

Task Area	Performance Requirements Class	D C G O S M R M U P T A I D N R A I V R R S F N	T S R U N S G T	I C F C N O O A D L R V L C	C P D R E I I R F T I F
5 Escape From System		y y	n	y y	y y n n m m l
18 Self recovery		y y	n	y y	y y n n m l m
19 System Protection From Threat		y y	n	y y	y y n n m m m
25 Vehicle Loading/Unloading		y y	n	y y	y y n n m m l

Collective System Util. Skill Sustainment

Task Area	Performance Requirements Class	D R I V	C M D	G U N	O P T	S T A	M A I N	T R A C K	S E N S E	I N T E R	C O M M	F I R E	C O N T R O L	C P D R E I R F T I F
9 Navigation		y	y					y	y	y	y	n	n	h m h
10 Prevention of Detection/Location		y	y				n	y	y	y	y	n	n	m m m

Collective System Ops. Skill Upgrade

Task Area	Performance Requirements Class	D R I V	C M D	G U I	O P T	S T A	M I N	T R A	S N	I C D	C N D	F O L	C A	C P D	P R E	D I F
18 Self recovery		y	y				n	y	y	y	y	n	n	m	l	m

Collective System Util. Skill Upgrade

Task Area	Performance Requirements Class	D R I V	C M D	G U P	O P T	S T A	M I N	T R A	S N	I N S	C R E	F D L	C R A	C N T	C P D	P R E	D I F	
9 Navigation		y	y							y	y	y	y	n	n	h	m	h
10 Prevention of Detection/Location		y	y				n			y	y	y	y	n	n	m	m	m

Collective System Ops. Cross Training

Task	Performance Requirements	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
Area	Class	R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F

19 System Protection From Threat	y y					n		y y		y y	n n			m m m		
----------------------------------	-----	--	--	--	--	---	--	-----	--	-----	-----	--	--	-------	--	--

25 Vehicle Loading/Unloading	y y					n		y y		y y	n n			m m l		
------------------------------	-----	--	--	--	--	---	--	-----	--	-----	-----	--	--	-------	--	--

Collective System Util. Cross Training

Task	Performance Requirements	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
Area	Class	R	M	U	P	T	A	R	U	N	O	O	A		R	E	I
		I	D	N	R	A	I	N	S	D	L	R			I	R	F
		V	R	R	S	F	N	G	T	V	L	C			T	I	F

10 Prevention of Detection/Location y y n y y y y n n m m m

Collective System Ops. Transition Training

Task Area	Performance Requirements Class	D R I V	C M D	G U P	O P T	S T A	M A I N	T R A I N	S I M U L A T O R	I N S T R U C T O R	C O O R D I N A T O R	F I E L D	C O N T R O L	P E R F O R M A N C E	D I F F I C U L T Y		
9 Navigation		y	y						y	y	y	y	n	n	h	m	h
18 Self recovery		y	y				n		y	y	y	y	n	n	m	l	m
19 System Protection From Threat		y	y				n		y	y	y	y	n	n	m	m	m
25 Vehicle Loading/Unloading		y	y				n		y	y	y	y	n	n	m	m	l

Collective System Util. Transition Training

Task Area	Performance Requirements Class	D R I V	C M D	G U P	O P T	S T A	M A I N	T R A N	S S E N	I N S T	C O N T	F O O T	C A L	C P D R E I R F T			
9 Navigation		y	y						y	y	y	y	n	n	h	m	h
10 Prevention of Detection/Location		y	y				n		y	y	y	y	n	n	m	m	m

Unit System Utilization Skill Acquisition

Task Area	Performance Requirements Class	D C G O S M	T S	I C F C	C P D
		R M U P T A	R U	N O O A	R E I
		I D N R A I	N S	D L R	I R F
		V R R S F N	G T	V L C	T I F

Unit System Utilization Skill Sustainment

Task Area	Performance Requirements Class	D C G O S M	T S	I C F C	C P D
		R M U P T A	R U	N O O A	R E I
		I D N R A I	N S	D L R	I R F
		V R R S F N	G T	V L C	T I F

Combined Arms System Utilization Skill Acquisition

Task Area	Performance Requirements Class	D C G O S M	T S	I C F C	C P D
		R M U P T A	R U	N O O A	R E I
		I D N R A I	N S	D L R	I R F
		V R R S F N	G T	V L C	T I F

Combined Arms System Utilization
Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A		R	E	I
		I	D	N	R	A	I	N	S	D	L	R			I	R	F
		V	R	R	S	F	N	G	T	V	L	C			T	I	F

APPENDIX I

TRAINING REQUIREMENTS ANALYSIS DATA FOR AFV ROCKET/MISSILE VEHICLE

Individual Common MOS Skill Acquisition

Task Area	Performance Requirements Class	D R I V	C M D	G U P	O P T	S T A	M A I	T S R U N S G T	I C N D V	F O O L C	C A R	C P D R E I R F T I F	
6 Establish/Maintain Communications		n	y	n			n	y y	y	n	n	n	h m m
9 Navigation		y	y	n			n	y y	y	y	n	n	h m m
10 Prevention of Detection/Location		y	y	y			n	y y	y	y	n	n	h m l

Individual System Ops. Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
5	Escape From System	y	y	y			n	y	y	y	y	n	n	m	m	m
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n	h	m	m
9	Navigation	y	y	n			n	y	y	y	y	n	n	h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n	h	m	l
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n	h	m	m
18	Self recovery	y	y	n			n	y	n	y	y	n	n	m	l	m
19	System Protection From Threat	y	y	n			n	y	y	y	y	n	n	h	m	m
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n	h	m	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n	m	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y	y			n	y	y	y	y	n	n	h	m	h
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n	h	m	m

Individual System Util. Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
9	Navigation	y	y	n			n	y	y	y	y	n	n	h	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n	h	m	m
19	System Protection From Threat	y	y	n			n	y	y	y	y	n	n	h	m	m
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n	h	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y	y			n	y	y	y	y	n	n	h	m	h

Individual System Ops. Skill Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
5	Escape From System	y	y	y			n	y	y	y	y	n	n	m	m	m
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n	h	m	m
9	Navigation	y	y	n			n	y	y	y	y	n	n	h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n	h	m	l
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n	h	m	m
18	Self recovery	y	y	n			n	y	n	y	y	n	n	m	l	m
19	System Protection From Threat	y	y	n			n	y	y	y	y	n	n	h	m	m
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n	h	m	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n	m	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y	y			n	y	y	y	y	n	n	h	m	h
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n	h	m	m

Individual System Util. Skill Sustainment

Task Area	Performance Requirements Class	D R I V	C M D	G U P	O P T	S T A	M A	T R U	S U	I N	C O	F O	C A	C P	D D
9	Navigation	y	y	n			n	y	y		y	y	n	n	h m m
11	Prevention of Interception/Jamming	n	y	n			n	y	y		y	n	n	n	h m m
19	System Protection From Threat	y	y	n			n	y	y		y	y	n	n	h m m
24	Vehicle Maneuvering	y	n	n			n	y	y		y	n	n	n	h m m
28	Weapon Delivery - Ground to Ground Missile	n	y	y			n	y	y		y	y	n	n	h m h

Individual System Ops. Skill Upgrade

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F		
		V	R	R	S	F	N	G	T	V	L	C	T	I	F		
5	Escape From System	y	y	y			n	y	y	y	y	n	n		m	m	m
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n		h	m	m
9	Navigation	y	y	n			n	y	y	y	y	n	n		h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n		h	m	l
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n		h	m	m
19	System Protection From Threat	y	y	n			n	y	y	y	y	n	n		h	m	m
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n		h	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y	y			n	y	y	y	y	n	n		h	m	h
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n		h	m	m

Individual System Util. Skill Upgrade

Task Area	Performance Requirements Class	D R I V	C M D R	G U N S	O P T I C S	S T R U C T U R E	T R A I N I N G	S I G N A L	I N T E L L I G E N C E	C O M M U N I C A T I O N	C O M P U T E R	P E R F O R M A N C E	
9 Navigation		y	y	n		n	y	y	y	y	n	n	h m m
11 Prevention of Interception/Jamming		n	y	n		n	y	y	y	n	n	n	h m m
19 System Protection From Threat		y	y	n		n	y	y	y	y	n	n	h m m
24 Vehicle Maneuvering		y	n	n		n	y	y	y	n	n	n	h m m
28 Weapon Delivery - Ground to Ground Missile		n	y	y		n	y	y	y	y	n	n	h m h

Individual System Ops. Skill Cross Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	
5	Escape From System	y	y	y			n	y	y	y	y	n	n	m	m	m
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n	h	m	m
9	Navigation	y	y	n			n	y	y	y	y	n	n	h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n	h	m	l
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n	h	m	m
18	Self recovery	y	y	n			n	y	n	y	y	n	n	m	l	m
19	System Protection From Threat	y	y	n			n	y	y	y	y	n	n	h	m	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n	m	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y	y			n	y	y	y	y	n	n	h	m	h
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n	h	m	m

Individual System Util. Skill Cross
Training

Task Area	Performance Requirements Class	D R I V	C M D R	G U N	O P T	S T A I N	M T S G T	T R A N S G T	S R U N S G T	I N D V I D	C O O P E R	F O R E C A S T	C O O P E R	P R E P A R E	D E F E N D		
9 Navigation		y	y	n		n		y	y		y	y	n	n	h	m	m
11 Prevention of Interception/Jamming		n	y	n		n		y	y		y	n	n	n	h	m	m
19 System Protection From Threat		y	y	n		n		y	y		y	y	n	n	h	m	m
28 Weapon Delivery - Ground to Ground Missile		n	y	y		n		y	y		y	y	n	n	h	m	h

Individual System Ops. Transition Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A		R	E	I
		I	D	N	R	A	I	N	S	D	L	R			I	R	F
		V	R	R	S	F	N	G	T	V	L	C			T	I	F
5	Escape From System	y	y	y			n	y	y	y	y	n	n		m	m	m
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n		h	m	m
9	Navigation	y	y	n			n	y	y	y	y	n	n		h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n		h	m	l
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n		h	m	m
18	Self recovery	y	y	n			n	y	n	y	y	n	n		m	l	m
19	System Protection From Threat	y	y	n			n	y	y	y	y	n	n		h	m	m
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n		h	m	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n		m	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y	y			n	y	y	y	y	n	n		h	m	h
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n		h	m	m

Individual System Util. Transition Training

Task Area	Performance Requirements Class	D R I V	C M D R	G U N S	O P T I C	S I G N	M A I N	T R A I N	S U P P O R T	I N F O R M	C O M M	F I R E	C O N T R	C O N T R	C O N T R	P R O C	D I S C	
9 Navigation		y	y	n		n		y	y	y	y	n	n			h	m	m
11 Prevention of Interception/Jamming		n	y	n		n		y	y	y	n	n	n			h	m	m
19 System Protection From Threat		y	y	n		n		y	y	y	y	n	n			h	m	m
24 Vehicle Maneuvering		y	n	n		n		y	y	y	n	n	n			h	m	m
28 Weapon Delivery - Ground to Ground Missile		n	y	y		n		y	y	y	y	n	n			h	m	h

Individual Leadership/Management Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F	
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F	
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n		h	m	m
9	Navigation	y	y	n			n	y	y	y	y	n	n		h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n		h	m	l
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n		h	m	m
19	System Protection From Threat	y	y	n			n	y	y	y	y	n	n		h	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y	y			n	y	y	y	y	n	n		h	m	h

Individual Crew Maintenance System Anatomy

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
5	Escape From System	y	y	y			n	y	y	y	y	n	n	m	m	m
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n	h	m	m
9	Navigation	y	y	n			n	y	y	y	y	n	n	h	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n	h	m	m
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n	h	m	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n	m	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y	y			n	y	y	y	y	n	n	h	m	h
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n	h	m	m

Individual Crew Troubleshooting Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A		R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	
5	Escape From System	y	y	y			n	y	y	y	y	n	n		m	m	m
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n		h	m	m
9	Navigation	y	y	n			n	y	y	y	y	n	n		h	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n		h	m	m
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n		h	m	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n		m	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y	y			n	y	y	y	y	n	n		h	m	h
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n		h	m	m

Individual Crew Repair Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
5	Escape From System	y	y	y			n	y	y	y	y	n	n	m	m	m
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n	h	m	m
9	Navigation	y	y	n			n	y	y	y	y	n	n	h	m	m
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n	h	m	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n	m	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y	y			n	y	y	y	y	n	n	h	m	h
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n	h	m	m

Individual Crew Troubleshooting Sustainment

Task Area	Performance Requirements Class	D R I V	C M D R	G U P R	O P T S	S T A I F N	T R N S G T	S U N S	I N D V L	C O D L	F O R	C A	C P D R E I R F T I F
5	Escape From System	y	y	y		n	y	y	y	y	n	n	m m m
6	Establish/Maintain Communications	n	y	n		n	y	y	y	n	n	n	h m m
9	Navigation	y	y	n		n	y	y	y	y	n	n	h m m
11	Prevention of Interception/Jamming	n	y	n		n	y	y	y	n	n	n	h m m
24	Vehicle Maneuvering	y	n	n		n	y	y	y	n	n	n	h m m
25	Vehicle Loading/Unloading	y	y	y		n	y	y	y	y	n	n	m m m
28	Weapon Delivery - Ground to Ground Missile	n	y	y		n	y	y	y	y	n	n	h m h
30	Weapon Function Management	n	n	y		n	y	y	y	n	n	n	h m m

Individual Crew Repair Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
5	Escape From System	y	y	y			n	y	y	y	y	n	n	m	m	m
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n	h	m	m
9	Navigation	y	y	n			n	y	y	y	y	n	n	h	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n	h	m	m
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n	h	m	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n	m	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y	y			n	y	y	y	y	n	n	h	m	h
30	Weapon Function Management	n	n	y			n	y	y	y	n	n	n	h	m	m

Individual Crew Maintenance Upgrade Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F		
		V	R	R	S	F	N	G	T	V	L	C	T	I	F		
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n		h	m	m
9	Navigation	y	y	n			n	y	y	y	y	n	n		h	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y	y			n	y	y	y	y	n	n		h	m	h

Maintainer Common MOS Skill Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n			y	y	y	y	y	n	n		h	m	m
32 Maintenance - Repair/Service		n	n	n			y	y	y	y	y	n	n		h	m	m

Individual Maintainer System Anatomy Acquisition

Task Area	Performance Requirements Class	D R I V	C M D R	G U N R	O P T S F	S T A I N	M A I N	T R A C K	S U R V	I N S T	C O N T	F E E D	C O N T	C O N T	C O N T	P R O C	D I S C	
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n		y		y	y	y	y	n	n			h	m	m
32 Maintenance - Repair/Service		n	n	n		y		y	y	y	y	n	n			h	m	m

Individual Maintainer Troubleshooting Skill
Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F		
		V	R	R	S	F	N	G	T	V	L	C	T	I	F		
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n			y	y	y	y	y	n	n		h	m	m
32 Maintenance - Repair/Service		n	n	n			y	y	y	y	y	n	n		h	m	m

Individual Maintainer Repair Skill
Acquisition

Task Area	Performance Requirements Class	D R I V	C M D R	G U N R	O P T I C	S T A I F N	T R N S G T	S U S T	I N D V L	C O D L	F O R C	C A T C	C R I T I F	P R I F I F	D I F F
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n		y	y	y	y	y	n	n	h	m	m
32 Maintenance - Repair/Service		n	n	n		y	y	y	y	y	n	n	h	m	m

Individual Maintainer Troubleshooting
Sustainment

Task Area	Performance Requirements Class	D R I V	C M D R	G U N R	O P T S	S T A I N	M T S G T	T S R U N S G T	I C F C N O O A D L R V L C	C P D R E I R F T I F
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n		y		y y	y y n n	h m m
32 Maintenance - Repair/Service		n	n	n		y		y y	y y n n	h m m

Individual Maintainer Repair Skill
Sustainment

Task Area	Performance Requirements Class	D R I V	C M D R	G U P R	O P T R	S T A I N	M A I N	T R A I N	S U P P O R T	I N S T R U C T O R	C O O R D I N A T O R	F I E L D	C O N T R O L	C O M M U N I C A T O R	P E R F O R M E R	D E V E L O P E R	
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n		y		y	y	y	y	n	n		h	m	m
32 Maintenance - Repair/Service		n	n	n		y		y	y	y	y	n	n		h	m	m

Individual Maintainer Skill Upgrade
Training

Task Area	Performance Requirements Class	D R I V	C M D R	G U P S	O P T S	S T A I N	T R N S G	S U N S T	I N D V	C O D E	F O O D	C O O L	C O O L	C O O L	C O O L	P E R F	D E F I	
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n		y	y	y	y	y	n	n				h	m	m
32 Maintenance - Repair/Service		n	n	n		y	y	y	y	y	n	n				h	m	m

Individual Maintainer Transition Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
31	Maintenance - Fault Isolation/Troubleshooting	n	n	n			y	y	y	y	y	n	n	h	m	m
32	Maintenance - Repair/Service	n	n	n			y	y	y	y	y	n	n	h	m	m

Maintainer Leadership/Management Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	
31	Maintenance - Fault Isolation/Troubleshooting	n	n	n			y	y	y	y	y	n	n		h	m	m
32	Maintenance - Repair/Service	n	n	n			y	y	y	y	y	n	n		h	m	m

Collective Common MOS Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	
9 Navigation		y	y	n			n	y	y	y	y	n	n		h	m	m

Collective System Ops. Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
5	Escape From System	y	y	y			n	y	y	y	y	n	n	m	m	m
9	Navigation	y	y	n			n	y	y	y	y	n	n	h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n	h	m	l
18	Self recovery	y	y	n			n	y	n	y	y	n	n	m	l	m
19	System Protection From Threat	y	y	n			n	y	y	y	y	n	n	h	m	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n	m	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y	y			n	y	y	y	y	n	n	h	m	h

Collective System Util. Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A		R	E	I
		I	D	N	R	A	I	N	S	D	L	R			I	R	F
		V	R	R	S	F	N	G	T	V	L	C			T	I	F
9	Navigation	y	y	n			n	y	y	y	y	n	n		h	m	m
19	System Protection From Threat	y	y	n			n	y	y	y	y	n	n		h	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y	y			n	y	y	y	y	n	n		h	m	h

Collective System Ops. Skill Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A		R	E	I
		I	D	N	R	A	I	N	S	D	L	R			I	R	F
		V	R	R	S	F	N	G	T	V	L	C			T	I	F
5	Escape From System	y	y	y			n	y	y	y	y	n	n		m	m	m
9	Navigation	y	y	n			n	y	y	y	y	n	n		h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n		h	m	l
18	Self recovery	y	y	n			n	y	n	y	y	n	n		m	l	m
19	System Protection From Threat	y	y	n			n	y	y	y	y	n	n		h	m	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n		m	m	m
28	Weapon Delivery - Ground to Ground Missile	n	y	y			n	y	y	y	y	n	n		h	m	h

Collective System Util. Skill Sustainment

Task Area	Performance Requirements Class	D R I V	C M D R	G U N S	O P T I M	S T A I N	T R A I N	S U S T	I N S T	C O O R	F O O T	C O O R	C P D R E I R F T I F
9 Navigation		y	y	n		n	y	y	y	y	n	n	h m m
19 System Protection From Threat		y	y	n		n	y	y	y	y	n	n	h m m
28 Weapon Delivery - Ground to Ground Missile		n	y	y		n	y	y	y	y	n	n	h m h

Collective System Ops. Skill Upgrade

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	
9 Navigation		y	y	n			n	y	y	y	y	n	n		h	m	m
28 Weapon Delivery - Ground to Ground Missile		n	y	y			n	y	y	y	y	n	n		h	m	h

Collective System Util. Skill Upgrade

Task Area	Performance Requirements Class	D R I V	C M D R	G U P S	O P T I F	S T A I N	T R N S G	S U S T	I N D V	C O D E	F O O T	C O O L	C O O L	C O O L	P R E I R	D I F F	
9 Navigation		y	y	n		n	y	y	y	y	n	n			h	m	m
28 Weapon Delivery - Ground to Ground Missile		n	y	y		n	y	y	y	y	n	n			h	m	h

Collective System Ops. Cross Training

Task Area	Performance Requirements Class	D C G O S M	T S	I C F C	C P D	
		R M U P T A	R U	N O O A	R E I	
		I D N R A I	N S	D L R	I R F	
		V R R S F N	G T	V L C	T I F	
9 Navigation		y y n	n	y y	y y n n	h m m
10 Prevention of Detection/Location		y y y	n	y y	y y n n	h m l
18 Self recovery		y y n	n	y n	y y n n	m l m
19 System Protection From Threat		y y n	n	y y	y y n n	h m m
25 Vehicle Loading/Unloading		y y y	n	y y	y y n n	m m m
28 Weapon Delivery - Ground to Ground Missile		n y y	n	y y	y y n n	h m h

Collective System Util. Cross Training

Task Area	Performance Requirements Class	D R I V	C M D R	G U P R	O P T S	S T A I F N	T R N S G T	S R S T	I N D V	C N D V	F O L C	C O A R	C R I T	P E I F	D I F
9 Navigation		y	y	n		n	y	y	y	y	n	n	h	m	m
19 System Protection From Threat		y	y	n		n	y	y	y	y	n	n	h	m	m
28 Weapon Delivery - Ground to Ground Missile		n	y	y		n	y	y	y	y	n	n	h	m	h

Collective System Ops. Transition Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
9 Navigation		y	y	n			n	y	y	y	y	n	n	h	m	m
10 Prevention of Detection/Location		y	y	y			n	y	y	y	y	n	n	h	m	l
18 Self recovery		y	y	n			n	y	n	y	y	n	n	m	l	m
19 System Protection From Threat		y	y	n			n	y	y	y	y	n	n	h	m	m
25 Vehicle Loading/Unloading		y	y	y			n	y	y	y	y	n	n	m	m	m
28 Weapon Delivery - Ground to Ground Missile		n	y	y			n	y	y	y	y	n	n	h	m	h

Collective System Util. Transition Training

Task Area	Performance Requirements Class	D R I V	C M D R	G U P R	O P T S	S T A I F N	T R N S G T	S U S T	I N D V	C N D V	F O L C	C A R C	C R I T I F
9 Navigation		y	y	n		n	y	y	y	y	n	n	h m m
19 System Protection From Threat		y	y	n		n	y	y	y	y	n	n	h m m
28 Weapon Delivery - Ground to Ground Missile		n	y	y		n	y	y	y	y	n	n	h m h

Unit System Utilization Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A		R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	

Unit System Utilization Skill Sustainment

Task Area	Performance Requirements Class	D C G O S M	T S	I C F C	C P D
		R M U P T A	R U	N O O A	R E I
		I D N R A I	N S	D L R	I R F
		V R R S F N	G T	V L C	T I F

Combined Arms System Utilization Skill Acquisition

Task Area	Performance Requirements Class	D C G O S M	T S	I C F C	C P D
		R M U P T A	R U	N O O A	R E I
		I D N R A I	N S	D L R	I R F
		V R R S F N	G T	V L C	T I F

Combined Arms System Utilization
Sustainment

Task	Performance Requirements	D C G O S M	T S	I C F C	C P D
Area	Class	R M U P T A	R U	N O O A	R E I
		I D N R A I	N S	D L R	I R F
		V R R S F N	G T	V L C	T I F

APPENDIX J

TRAINING REQUIREMENTS ANALYSIS DATA FOR AFV ARMORED SECURITY/ESCORT VEHICLE

Individual Common MOS Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n		h	m	m
9	Navigation	n	y	y			n	y	y	y	n	n	n		h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n		m	m	m

Individual System Ops. Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F	
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F	
5	Escape From System	y	y	y			n	y	y	y	y	n	n		h	l	l
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n		h	m	m
9	Navigation	n	y	y			n	y	y	y	n	n	n		h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n		m	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n		h	m	m
18	Self recovery	y	y	y			n	y	y	y	y	n	n		m	l	m
19	System Protection From Threat	n	y	y			n	y	y	y	y	n	n		h	m	m
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n		h	h	h
21	Target Behavior Prediction	n	n	y			n	y	y	y	n	n	n		h	h	h
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n		h	m	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n		m	l	l
27	Weapon Delivery (General)	n	n	y			n	y	y	y	n	n	n		h	m	m

Individual System Util. Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
10 Prevention of Detection/Location		y	y	y			n	y	y	y	y	n	n	m	m	m
19 System Protection From Threat		n	y	y			n	y	y	y	y	n	n	h	m	m
20 Target Acquisition		n	y	y			n	y	y	y	y	n	n	h	h	h
24 Vehicle Maneuvering		y	n	n			n	y	y	y	n	n	n	h	m	m
27 Weapon Delivery (General)		n	n	y			n	y	y	y	n	n	n	h	m	m

Individual System Ops. Skill Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	
5	Escape From System	y	y	y			n	y	y	y	y	n	n	h	l	l
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n	h	m	m
9	Navigation	n	y	y			n	y	y	y	n	n	n	h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n	m	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n	h	m	m
18	Self recovery	y	y	y			n	y	y	y	y	n	n	m	l	m
19	System Protection From Threat	n	y	y			n	y	y	y	y	n	n	h	m	m
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n	h	h	h
21	Target Behavior Prediction	n	n	y			n	y	y	y	n	n	n	h	h	h
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n	h	m	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n	m	l	l
27	Weapon Delivery (General)	n	n	y			n	y	y	y	n	n	n	h	m	m

Individual System Util. Skill Sustainment

Task	Performance Requirements	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
Area	Class	R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n	m	m	m
19	System Protection From Threat	n	y	y			n	y	y	y	y	n	n	h	m	m
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n	h	h	h
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n	h	m	m
27	Weapon Delivery (General)	n	n	y			n	y	y	y	n	n	n	h	m	m

Individual System Ops. Skill Upgrade

Task Area	Performance Requirements Class	D R I V	C M D R	G U P R	O P T S	S T A I N	T R N S G	S R U S T	I N D V	C O D L	F O R V	C O O L	A A R C	C P R T	D E I F I	
6	Establish/Maintain Communications	n	y	n		n	y	y	y	n	n	n	n	h	m	m
9	Navigation	n	y	y		n	y	y	y	n	n	n	n	h	m	m
10	Prevention of Detection/Location	y	y	y		n	y	y	y	y	n	n	n	m	m	m
11	Prevention of Interception/Jamming	n	y	n		n	y	y	y	n	n	n	n	h	m	m
19	System Protection From Threat	n	y	y		n	y	y	y	y	n	n	n	h	m	m
20	Target Acquisition	n	y	y		n	y	y	y	y	n	n	n	h	h	h
21	Target Behavior Prediction	n	n	y		n	y	y	y	n	n	n	n	h	h	h
27	Weapon Delivery (General)	n	n	y		n	y	y	y	n	n	n	n	h	m	m

Individual System Util. Skill Upgrade

Task Area	Performance Requirements Class	D R I V	C M D R	G U N	O P T	S T A I N	M T S G T	T R A N S G T	S R U N S G T	I N D V I D	C O O R D	F O O T C A T	C P D R E I R F T I F			
10 Prevention of Detection/Location		y	y	y			n	y	y	y	y	n	n	m	m	m
19 System Protection From Threat		n	y	y			n	y	y	y	y	n	n	h	m	m
20 Target Acquisition		n	y	y			n	y	y	y	y	n	n	h	h	h
27 Weapon Delivery (General)		n	n	y			n	y	y	y	n	n	n	h	m	m

Individual System Ops. Skill Cross Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F	
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F	
5	Escape From System	y	y	y			n	y	y	y	y	n	n		h	l	l
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n		h	m	m
9	Navigation	n	y	y			n	y	y	y	n	n	n		h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n		m	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n		h	m	m
18	Self recovery	y	y	y			n	y	y	y	y	n	n		m	l	m
19	System Protection From Threat	n	y	y			n	y	y	y	y	n	n		h	m	m
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n		h	h	h
21	Target Behavior Prediction	n	n	y			n	y	y	y	n	n	n		h	h	h
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n		m	l	l
27	Weapon Delivery (General)	n	n	y			n	y	y	y	n	n	n		h	m	m

Individual System Util. Skill Cross
Training

Task Area	Performance Requirements Class	D R I V	C M D	G U N	O P T	S T A I N	T R A I N	S U B M E R I N	I N S T R U C T O R	C O O R D I N A T O R	F I E L D	C O M M A N D E R	P E R F O R M E R	D E F E N D E R	
10	Prevention of Detection/Location	y	y	y		n	y	y	y	y	n	n	m	m	m
19	System Protection From Threat	n	y	y		n	y	y	y	y	n	n	h	m	m
20	Target Acquisition	n	y	y		n	y	y	y	y	n	n	h	h	h
27	Weapon Delivery (General)	n	n	y		n	y	y	y	n	n	n	h	m	m

Individual System Ops. Transition Training

Task Area	Performance Requirements Class	D R I V	C M D	G U P	O P T	S T A	T R A	S U N	I N S	C O D	F O L	C A	C P D	P R I	D E I	
5	Escape From System	y	y	y		n		y	y	y	y	n	n	h	l	l
6	Establish/Maintain Communications	n	y	n		n		y	y	y	n	n	n	h	m	m
9	Navigation	n	y	y		n		y	y	y	n	n	n	h	m	m
10	Prevention of Detection/Location	y	y	y		n		y	y	y	y	n	n	m	m	m
11	Prevention of Interception/Jamming	n	y	n		n		y	y	y	n	n	n	h	m	m
18	Self recovery	y	y	y		n		y	y	y	y	n	n	m	l	m
19	System Protection From Threat	n	y	y		n		y	y	y	y	n	n	h	m	m
21	Target Behavior Prediction	n	n	y		n		y	y	y	n	n	n	h	h	h
24	Vehicle Maneuvering	y	n	n		n		y	y	y	n	n	n	h	m	m
25	Vehicle Loading/Unloading	y	y	y		n		y	y	y	y	n	n	m	l	l
27	Weapon Delivery (General)	n	n	y		n		y	y	y	n	n	n	h	m	m

Individual System Util. Transition Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n	m	m	m
19	System Protection From Threat	n	y	y			n	y	y	y	y	n	n	h	m	m
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n	h	h	h
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n	h	m	m
27	Weapon Delivery (General)	n	n	y			n	y	y	y	n	n	n	h	m	m

Individual Leadership/Management Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F		
		V	R	R	S	F	N	G	T	V	L	C	T	I	F		
9	Navigation	n	y	y			n	y	y	y	n	n	n		h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n		m	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n		h	m	m
19	System Protection From Threat	n	y	y			n	y	y	y	y	n	n		h	m	m

Individual Crew Maintenance System Anatomy

Task	Performance Requirements	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
Area	Class	R	M	U	P	T	A	R	U	N	O	O	A		R	E
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n		h	m
9	Navigation	n	y	y			n	y	y	y	n	n	n		h	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n		m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n		h	m
19	System Protection From Threat	n	y	y			n	y	y	y	y	n	n		h	m
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n		h	h
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n		h	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n		m	l
27	Weapon Delivery (General)	n	n	y			n	y	y	y	n	n	n		h	m

Individual Crew Troubleshooting Skill
Acquisition

Task Area	Performance Requirements Class	D R I V	C M D	G U P	O P T	S T A	M A I N	T R A I N I N G	S U P P O R T	I N S T R U C T I O N	C O O R D I N A T I O N	F E E D B A C K	C O M M U N I C A T I O N	P E R F O R M A N C E	D I A G N O S T I C S	
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n	h	m	m
9	Navigation	n	y	y			n	y	y	y	n	n	n	h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n	m	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n	h	m	m
19	System Protection From Threat	n	y	y			n	y	y	y	y	n	n	h	m	m
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n	h	h	h
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n	h	m	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n	m	l	l
27	Weapon Delivery (General)	n	n	y			n	y	y	y	n	n	n	h	m	m

Individual Crew Repair Skill Acquisition

Task Area	Performance Requirements Class	D R I V	C M D	G U N	O P R	S T A I S	T R A N S G	S U B S	I N D	C O D	F O L	C A	C P D R E I R F T
6	Establish/Maintain Communications	n	y	n		n	y	y	y	n	n	n	h m m
9	Navigation	n	y	y		n	y	y	y	n	n	n	h m m
10	Prevention of Detection/Location	y	y	y		n	y	y	y	y	n	n	m m m
11	Prevention of Interception/Jamming	n	y	n		n	y	y	y	n	n	n	h m m
19	System Protection From Threat	n	y	y		n	y	y	y	y	n	n	h m m
20	Target Acquisition	n	y	y		n	y	y	y	y	n	n	h h h
24	Vehicle Maneuvering	y	n	n		n	y	y	y	n	n	n	h m m
25	Vehicle Loading/Unloading	y	y	y		n	y	y	y	y	n	n	m l l
27	Weapon Delivery (General)	n	n	y		n	y	y	y	n	n	n	h m m

Individual Crew Troubleshooting Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F	
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F	
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n		h	m	m
9	Navigation	n	y	y			n	y	y	y	n	n	n		h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n		m	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n		h	m	m
19	System Protection From Threat	n	y	y			n	y	y	y	y	n	n		h	m	m
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n		h	h	h
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n		h	m	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n		m	l	l
27	Weapon Delivery (General)	n	n	y			n	y	y	y	n	n	n		h	m	m

Individual Crew Repair Sustainment

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F	
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F	
6	Establish/Maintain Communications	n	y	n			n	y	y	y	n	n	n		h	m	m
9	Navigation	n	y	y			n	y	y	y	n	n	n		h	m	m
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n		m	m	m
11	Prevention of Interception/Jamming	n	y	n			n	y	y	y	n	n	n		h	m	m
19	System Protection From Threat	n	y	y			n	y	y	y	y	n	n		h	m	m
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n		h	h	h
24	Vehicle Maneuvering	y	n	n			n	y	y	y	n	n	n		h	m	m
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n		m	l	l
27	Weapon Delivery (General)	n	n	y			n	y	y	y	n	n	n		h	m	m

Individual Crew Maintenance Upgrade Training

Task Area	Performance Requirements Class	D R I V	C M D R	G U P P	O T A I N	S M A I N	T R A I N	S U P P L	I N S T R	C O U R S	F O U N D	C O U R S	C O U R S	C O U R S	P E R F O	D E M O	
6	Establish/Maintain Communications	n	y	n		n	y	y	y	n	n	n	n		h	m	m
11	Prevention of Interception/Jamming	n	y	n		n	y	y	y	n	n	n	n		h	m	m

Maintainer Common MOS Skill Training

Task Area	Performance Requirements Class	D R I V	C M D R	G U P R	O P T S	S T A I N	M T R N	T R N S G T	S U S T	I N D V	C O D L	F O R C	C A R C	C R I T	P E R F	D I F	
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n		y		y	y	y	y	n	n		h	m	m
32 Maintenance - Repair/Service		n	n	n		y		y	y	y	y	n	n		h	m	m

Individual Maintainer System Anatomy Acquisition

Task Area	Performance Requirements Class	D R I V	C M D	G U P	O P T	S T A	M A I N	T S R U N S G T	I C N D V	F C O L C	C P D R E I R F T I F
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n			y	y y	y y	n n	h m m
32 Maintenance - Repair/Service		n	n	n			y	y y	y y	n n	h m m

Individual Maintainer Troubleshooting Skill
Acquisition

Task Area	Performance Requirements Class	D R I V	C M D R	G U N R	O P T I C	S T R U C T U R	M A I N T E N A N C E	T R A I N I N G	S I M U L A T I O N	I N S T R U C T I O N	C O U N T E R P A R T I S I O N	F E E D B A C K	C O O R D I N A T I O N	P E R F O R M A N C E	D I F F I C U L T Y		
31	Maintenance - Fault Isolation/Troubleshooting	n	n	n		y		y	y		y	y	n	n	h	m	m
32	Maintenance - Repair/Service	n	n	n		y		y	y		y	y	n	n	h	m	m

Individual Maintainer Repair Skill
Acquisition

Task Area	Performance Requirements Class	D R I V	C M D	G U N	O P T	S T A I N	T R A N S M I T	S I G N A L	I N T E R F A C E	C O N T R O L	C O M M U N I C A T I O N	P R O C E D U R E	D I S T R I B U T I O N
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n		y	y	y	y	y	n	n	h m m
32 Maintenance - Repair/Service		n	n	n		y	y	y	y	y	n	n	h m m

Individual Maintainer Troubleshooting
Sustainment

Task Area	Performance Requirements Class	D R I V	C M D R	G U N R	O P T I C	S T R U C T U R E	M A I N T E N A N C E	T S R U N S G T	I C F C N O O A D L R V L C	C P D R E I R F T I F
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n		y		y y	y y n n	h m m
32 Maintenance - Repair/Service		n	n	n		y		y y	y y n n	h m m

Individual Maintainer Repair Skill
Sustainment

Task Area	Performance Requirements Class	D R I V	C M D R	G U N R	O P T I C	S T A I N	T R A C K	S U P P L	I N S T R	C O N T R	F E E D	C O O L	C A P A	C P D R E I R T I F
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n		y	y	y	y	y	n	n		h m m
32 Maintenance - Repair/Service		n	n	n		y	y	y	y	y	n	n		h m m

Individual Maintainer Skill Upgrade Training

Task Area	Performance Requirements Class	D R I V	C M D R	G U P P	O T A I N	S M A I N	T R A I N	S U P P L	I N S T R	C O O R D	F O O B A R	C A P A B	C P D R E I R F T
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n		y	y	y	y	y	n	n	h m m
32 Maintenance - Repair/Service		n	n	n		y	y	y	y	y	n	n	h m m

Individual Maintainer Transition Training

Task Area	Performance Requirements Class	D R I V	C M D R	G U P R	O P T R	S T A I S F N	M A I N S F N	T R N S G T	S R U N S G T	I N D L V	C N D L C	F O L C	C O L C	C P D R E I R F T I F
31 Maintenance - Fault Isolation/Troubleshooting		n	n	n		y		y	y	y	y	n	n	h m m
32 Maintenance - Repair/Service		n	n	n		y		y	y	y	y	n	n	h m m

Maintainer Leadership/Management Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
31	Maintenance - Fault Isolation/Troubleshooting	n	n	n			y	y	y	y	y	n	n		h	m
32	Maintenance - Repair/Service	n	n	n			y	y	y	y	y	n	n		h	m

Collective Common MOS Skill Acquisition

Task Area	Performance Requirements Class	D C G O S M	T S	I C F C	C P D
		R M U P T A	R U	N O O A	R E I
		I D N R A I	N S	D L R	I R F
		V R R S F N	G T	V L C	T I F

Collective System Ops. Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I	
		I	D	N	R	A	I	N	S	D	L	R		I	R	F	
		V	R	R	S	F	N	G	T	V	L	C		T	I	F	
5	Escape From System	y	y	y			n	y	y	y	y	n	n		h	l	l
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n		m	m	m
19	System Protection From Threat	n	y	y			n	y	y	y	y	n	n		h	m	m
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n		h	h	h
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n		m	l	l

Collective System Util. Skill Acquisition

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n	m	m	m
18	Self recovery	y	y	y			n	y	y	y	y	n	n	m	l	m
19	System Protection From Threat	n	y	y			n	y	y	y	y	n	n	h	m	m
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n	h	h	h

Collective System Ops. Skill Sustainment

Task Area	Performance Requirements Class	D R I V	C M D R	G U P R	O P T S	S T A I N	T R A I N	S U P P O R T	I N S T R U C T O R	C O O R D I N A T O R	C O O R D I N A T O R	P E R F O R M A N C E	D E T A I L S		
5	Escape From System	y	y	y		n	y	y	y	y	n	n	h	l	l
10	Prevention of Detection/Location	y	y	y		n	y	y	y	y	n	n	m	m	m
19	System Protection From Threat	n	y	y		n	y	y	y	y	n	n	h	m	m
20	Target Acquisition	n	y	y		n	y	y	y	y	n	n	h	h	h
25	Vehicle Loading/Unloading	y	y	y		n	y	y	y	y	n	n	m	l	l

Collective System Util. Skill Sustainment

Task Area	Performance Requirements Class	D R I V	C M D	G U N	O P T	S T A I N	T R A N S G	S U B S T I T	I N D I C	C O N T R	F E E D B	C O M M U	C O N T R	C O N T R	C O N T R	C O N T R	C O N T R
10 Prevention of Detection/Location		y	y	y		n	y	y	y	y	n	n	m	m	m		
18 Self recovery		y	y	y		n	y	y	y	y	n	n	m	l	m		
19 System Protection From Threat		n	y	y		n	y	y	y	y	n	n	h	m	m		
20 Target Acquisition		n	y	y		n	y	y	y	y	n	n	h	h	h		

Collective System Ops. Skill Upgrade

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A		R	E	I
		I	D	N	R	A	I	N	S	D	L	R			I	R	F
		V	R	R	S	F	N	G	T	V	L	C			T	I	F
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n		m	m	m
19	System Protection From Threat	n	y	y			n	y	y	y	y	n	n		h	m	m
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n		h	h	h

Collective System Util. Skill Upgrade

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D	
		R	M	U	P	T	A	R	U	N	O	O	A		R	E	I
		I	D	N	R	A	I	N	S	D	L	R			I	R	F
		V	R	R	S	F	N	G	T	V	L	C			T	I	F
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n		m	m	m
19	System Protection From Threat	n	y	y			n	y	y	y	y	n	n		h	m	m
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n		h	h	h

Collective System, Ops. Cross Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
5	Escape From System	y	y	y			n	y	y	y	y	n	n	h	l	l
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n	m	m	m
18	Self recovery	y	y	y			n	y	y	y	y	n	n	m	l	m
19	System Protection From Threat	n	y	y			n	y	y	y	y	n	n	h	m	m
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n	h	h	h
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n	m	l	l

Collective System Util. Cross Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n	m	m	m
19	System Protection From Threat	n	y	y			n	y	y	y	y	n	n	h	m	m
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n	h	h	h

Collective System Ops. Transition Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R		I	R	F
		V	R	R	S	F	N	G	T	V	L	C		T	I	F
5	Escape From System	y	y	y			n	y	y	y	y	n	n	h	l	l
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n	m	m	m
18	Self recovery	y	y	y			n	y	y	y	y	n	n	m	l	m
19	System Protection From Threat	n	y	y			n	y	y	y	y	n	n	h	m	m
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n	h	h	h
25	Vehicle Loading/Unloading	y	y	y			n	y	y	y	y	n	n	m	l	l

Collective System Util. Transition Training

Task Area	Performance Requirements Class	D	C	G	O	S	M	T	S	I	C	F	C	C	P	D
		R	M	U	P	T	A	R	U	N	O	O	A	R	E	I
		I	D	N	R	A	I	N	S	D	L	R	I	R	F	F
		V	R	R	S	F	N	G	T	V	L	C	T	I	F	F
10	Prevention of Detection/Location	y	y	y			n	y	y	y	y	n	n	m	m	m
19	System Protection From Threat	n	y	y			n	y	y	y	y	n	n	h	m	m
20	Target Acquisition	n	y	y			n	y	y	y	y	n	n	h	h	h

Unit System Utilization Skill Acquisition

Task Area	Performance Requirements Class	D C G O S M	T S	I C F C	C P D
		R M U P T A	R U	N O O A	R E I
		I D N R A I	N S	D L R	I R F
		V R R S F N	G T	V L C	T I F

Unit System Utilization Skill Sustainment

Task Area	Performance Requirements Class	D C G O S M	T S	I C F C	C P D
		R M U P T A	R U	N O O A	R E I
		I D N R A I	N S	D L R	I R F
		V R R S F N	G T	V L C	T I F

Page No. 1 Combined Arms System Utilization Skill
Acquisition

07/30/87

Task	Performance Requirements	D C G O S M	T S	I C F C	C P D
Area	Class	R M U P T A	R U	N O O A	R E I
		I D N R A I	N S	D L R	I R F
		V R R S F N	G T	V L C	T I F

Combined Arms System Utilization Sustainment

Task Area	Performance Requirements Class	D R I V	C M D R	G U N R	O P T S	S T A I N	T R A C T	S U P P O	I N D U	C O N T	F O O D	C A R E	C R E D I T	P R E I R I T	D I F F I C I T
-----------	--------------------------------	------------------	------------------	------------------	------------------	-----------------------	-----------------------	-----------------------	------------------	------------------	------------------	------------------	----------------------------	---------------------------------	--------------------------------------